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THE NONOPERATIVE AND OPERATIVE TREATMENT OF GLAUCOMA.

F. PHINIZY CALHOUN, M.D.

ATLANTA, GEORGIA.

This paper summarizes the writer's views and experience bearing on the treatment of glaucoma. Two main types of glaucoma, the congestive and the simple, are emphasized; and the medicinal and operative treatment for each, approved by the writer's experience, is stated. For the congestive type operation is required, but preliminary medical treatment may be very helpful. For simple glaucoma operation may not always be necessary; and, when required, the choice may fall on one of several methods. Read at the Sectional meeting on Ophthalmology of the American College of Surgeons, New York City, October 23, 1924.

In this paper, I present only a review of some of the safer and saner ideas concerning the treatment of glaucoma and the recital of my personal experience, whenever it may be of value. With this thought in mind I ask your attention to the subject assigned me, limiting my remarks to: First, the congestive type, and second, the noncongestive type (glaucoma simplex).

CONGESTIVE GLAUCOMA

The symptoms and pathology in the congestive type are so well defined that, except in unusual cases, our duty is clear, namely to operate.

Unfortunately the predisposing factors which cause the sudden closure of the angle of filtration are not always understood, indeed they may be many and widely different. But we have given us one sign, increased intraocular tension, which, as Fuchs describes in his classical treatise on the subject, "is the essence of all glaucoma." This one symptom is as important an index in glaucoma, as is fever in any infection, and our first duty is to make the patient safe and comfortable, and then classify and treat the underlying cause.

It would seem unscientific to reduce the tension in a prodromal attack, without making a careful survey of the body. It would be too academic for me to review the various causes assigned and I ask your pardon if I inject the subject of endocrinology into our discussion. The more I study my cases of glaucoma am I convinced that there is an intimate association with a disturbed function of the glands of internal secretion, in a selected few. Endocrinology is only in its experimental stage, but there is too strong clinical evidence in ophthalmology, to consider this relationship only a phantasy.

While sleeplessness, anxiety and excitement, occurring at a time in life when there is a tendency to a loss of vasomotor control, have long been regarded as predisposing factors for precipitating sudden attacks of glaucoma, it would seem in the light of our present knowledge that this predisposition is an expression of an endocrine unbalance. I have in mind two cases observed long ago which seem to justify this statement. A thin, dry skinned clergyman, age 60, of the socalled "nervous temperament," developed regularly every year for five years an acute attack of glaucoma, preceding the announcement by his Bishop of his pastorate for the following year. In spite of operations and treatment blindness developed.

Again, a stout, cultured Jewish woman, about the time of her menopause, developed a mild attack of glaucoma which was thought to have been precipitated by great mental distress occasioned by a serious family disturbance. She refused treatment or operation, on account of her leaning toward Christian Science, but when the cause of her mental distress was soon corrected, the eye became normal and has remained so for twelve years.

Can we refuse to say that in these cases there was not some break in the

equilibrium, which was directly due to a sudden disturbance in the function of certain glands, already undergoing a degeneration. I cannot allow these and other observations to pass without justly considering their relation to glaucoma. You have had similar experiences I know.

As has been intimated the treatment for the congestive type of glaucoma is always operative, but does that apply to every prodromal attack? The intelligence of the patient, and the ability to understand the seriousness of the condition and the desire to carry out the treatment, largely influences me in the advice which I offer. With the clinical patient, and the patient who always treats his ailments or his doctor's advice lightly, patients who live at a distance and cannot receive adequate consultations, I always suggest an operation. The remaining class may be held under observation and treatment.

An eminent jurist developed a mild prodromal attack of glaucoma. It was my endeavor to prevent an operation, and without any intention of alarming him, we talked earnestly concerning the subject of glaucoma as to its causes, consequences and treatment, for he was able to appreciate it. After several months of observation, during which time the eye remained normal, he frankly told me of the constant anxiety under which he lived, and that the daily care was more than he could bear, and asked that I operate. After all, the nonoperative class narrows itself down to a very few. If you or I had a mild attack of acute glaucoma, I believe that we would defer operation and feel perfectly safe and justifiable in our course.

In the medical treatment for the prodromal attack we have little choice. An initial instillation of medium strength eserin (one grain to the ounce) is quite sufficient to contract the pupil, which contraction can be maintained by pilocarpin solution (one or two grains to the ounce). Both eyes should be similarly treated and the patient kept under observation.

In operative cases, whenever it is possible, practicable or safe, I always prefer to give the patient in an acute attack of glaucoma, six to twelve hours rest and preliminary treatment in the hospital, which consists of the following procedures:

Absolute rest and quiet which is induced by an opiate.

A calomel and saline purge; magnesium sulphat (three ounces to six ounces of water) is given by rectum every four hours for the purpose of dehydration. If it is possible to administer it by mouth in half the strength, its action is more prompt. Every two hours moist hot packs are applied to the eye for twenty minutes, preceeding which is instilled a drop of 5% dionin solution, and afterwards a drop of ¼% eserin solution. Dionin dilates the lymphatics and blood vessels in anterior segment of the globe; and by its anesthetic effect upon the corneal nerve filaments, it allows a more rapid absorption of drugs by the cornea. The diet is restricted to soft food, with practically no liquid. I usually find that the tension has fallen 10 to 20 points, the chamber has become deeper and the pupil smaller after this preparation, and that the eye and patient are in better condition for operation.

I am aware that often the delay of a few hours decides the question between blindness and some vision, and in such violent cases an immediate operation is performed. To deviate the slightest from the principles of the classic iridectomy of von Graefe, would be heresy. Indeed I believe that any other procedure would be perilous. I am not brave enough to trephine in such cases, as I have seen done with surprisingly excellent results. But how many eyes have been lost!

If this view is generally accepted, the question is, what is the best way to perform an iridectomy? If there are no contraindications, I prefer and usually give ether anesthesia. The operation is exquisitely painful, the patient usually has little control of the eye, and the surgeon cannot be deliberate in performing the most delicate operation in ophthalmology. Quickly performed iridectomies and an incomplete

toilet to the wound, especially to the freeing of the incarcerated pillars, are often responsible for failures when done under local anesthesia. A subconjunctival bleb of novocain and adrenalin solution, allowing full time for absorption, is always a great aid even as a preliminary to ether anesthesia.

The fixation of the globe by suture, or preferably by catch forceps, to the superior rectus muscle, is often of value in depressing the globe and preventing lateral rotations. I, however, do not adopt this procedure routinely.

I think it is a matter of individual preference whether the angular keratome or the small thin blade cataract knife is the best instrument to use. With an almost obliterated anterior chamber and an iris in contact with the cornea, the lens is much safer from injury when the section is made with the knife. I have seen one surgeon, whom you will have the privilege of witnessing operate, get into and out of this type of eye, with the greatest ease and safety. I regard it as a dangerous procedure except in the hands of the most expert. If the point of the keratome should engage the iris, it is not advisable to entirely withdraw it in an effort to pass. The chamber will be still further obliterated by the escape of aqueous.

I am not an advocate of performing regularly a posterior sclerotomy, as a preliminary procedure to reduce tension and deepen the anterior chamber, as is frequently practiced by our English confreres. It possibly has its place as an operative procedure and should be remembered, but its dangers and complications are too obvious.

I do advocate that the aqueous be allowed to slowly escape, which is permitted by allowing the cutting instrument to remain in position for a moment and to gently depress it in its gradual withdrawal. It allows the vessels of the globe and of the iris especially, which have been compressed by increased tension, to slowly fill, thus preventing intraocular hemorrhage. One can be even more deliberate in using the knife than the keratome, for the point of the latter must be closely watched every moment, less injury be done to the advancing lens. A scleral incision, made under a conjunctival flap, offers greater safety, a more rapid restoration of the chamber and the possibility of the formation of a filtering cicatrix. While a cleanly cut corneal section is a necessary part of the operation, a properly performed iridectomy is more essential for success. While it is true that at times a disappointing operation, with incarceration of the iris pillars, will give excellent results, it should be our desire to properly perform every detail of the operation with the utmost care.

I will reserve the description of the method of performing an iridectomy with the idea of opening up the filtration angle until we discuss glaucoma simplex. Some blood in the anterior chamber is to be expected in most cases following operation and it can be easily irrigated out. It rarely causes trouble and within twenty-four hours to forty-eight hours it is absorbed. When hemorrhage is severe it does seem to promote iritis. With persistent oozing of a small scleral vessel at the site of the incision, which leaks into the chamber, the application of a cotton pledget saturated with adrenalin frequently checks it.

I usually instill eserin solution in the eye after an operation, unless the hemorrhage is severe, and hot moist compresses are applied three times a day, as soon as the chamber is restored. If hemorrhage is severe I use miotics sparingly. An iritis may be developing and if detected, one drop of atropin is used, provided the tension is down.

In as much as glaucoma may develop in the opposite eye following an operation, it is advisable as a safeguard to keep that pupil contracted. We may argue that in as much as congestive glaucoma is often a bilateral affection, it would be proper to perform an iridectomy on the sound eye. Indeed I have adopted this in a few instances when there has been a history of prodromal attacks.

Massage has little effect on eyes as a pre- or postoperative procedure in the congestive type. I recently have

had an unusual experience in which, however, it was of great assistance. In a subacute glaucoma, with a fairly full anterior chamber, in which a corneal section and iridectomy were easily made, the eye immediately became stony hard with the development of a steamy cornea, while the speculum was in place. I attributed this acute stage to the lens having been subluxated or pushed forward, entirely blocking all drainage. Massage for a few moments completely reduced the tension and cleared the cornea.

GLAUCOMA SIMPLEX

I believe that I am safe in saying that the man is brave who will make any dogmatic statements before this College concerning the treatment of glaucoma simplex. We in ophthalmology fall short in our duty, as men of medicine, when we devote more time and thought to the surgical rather than to the medical side of our specialty. In our study of glaucoma, we do little investigate with the aid of others, the cause for this increase in intraocular tension, and are usually content in advising an early operation. With no attempt to flaunt my beliefs without proof, I venture the opinion that in this unknown disease there are as many factors which influence this elevation in tension, as cause hyperarterial tension. The careful internist is not content without a general examination of the body and its fluid.

In ophthalmology, we find those who advocate the treatment of glaucoma simplex with miotics, and a still larger majority, usually the surgeon of undoubted skill, who advocate an early operation in all cases. One must admit that medicinal treatment is useful to a limited few, whereas the surgical treatment is best suited for the rank and file of glaucomatous eyes. To insure success by either method, early diagnosis and early treatment is essential; that is, early cases are more amenable to treatment, either by miotics or surgery, than those in the more advanced stages. Each one of you has had at least one glaucomatous eye under miotic treatment for years, with a good preservation of sight and fields, and an ocular tension kept within normal limits. Are you certain that any operation, with its possible risks or complications, would have done more?

I have studied with much benefit two important contributions to the subject of glaucoma simplex, which relate particularly to the cause and general treatment. One by Charlin, "The Vascular Condition of Glaucoma," the other by Imre, "The Endocrin Origin of Primary Glaucoma." If you have not already been impressed with the need of general examinations and treatment, I beg that you read them.

To continue further in this plea for general examinations in cases of glaucoma simplex, particularly as an aid in our treatment, I would wander away from the subject. But I would say with all emphasis that we should view the subject very broadly, not entirely considering the disease as a local disturbance, but as one indirectly caused from some bodily ailment; among the few to be considered are disturbances of the cardio-vascular-renal and gastro-intestinal systems, focal infections and an endocrine imbalance. The treatment would necessarily vary beyond the limitations of our specialty.

In fact, "glaucoma is a disease which comes on at any age when wear and tear, harassing vicissitudes, misfortunes, exposures, overwork and vicious living have sapped the physiologic foundation of life; when infections have found entrance thru the door way of the epithelium; and when a variety of toxic and autotoxic, and other influences have set up vascular and cardio-vascular disease, associated with nephritis and high blood pressure. Glaucoma rarely occurs in individuals in good general health." Thus spoke Samuel D. Risley some years ago, and our present mode of life has not changed.

I believe that in a small proportion of private patients, medicinal treatment should be tried for a reasonable time, carefully watching the vision, visual field and tension. Should there be progressive reduction in the first two after the use of miotics and treatment

for evidenced disorders having a definite bearing upon increased intraocular tension, an operation should be discussed. Intraocular tension is such a variable factor, rises and falls often occurring many times daily, that I do not consider it so important a sign, unless it is persistently high. In this opinion I may not have your support.

Factors which would influence me to use miotic treatment would be: (1) In patients beyond 60 years of age, or with some incurable disease, where the expectancy of life would not be more than 10 years, (2) In patients, blind in one eye from glaucoma, with a small field and good central vision in the opposite eye. Any operation may suddenly wipe out central vision. I advise the greatest caution in such desperate cases. (3) In patients with one eye lost by operation from complications or accident, with early symptoms in the opposite eye.

In taking routine finger tension, I occasionally meet with an eye which I believe shows an elevation, yet the tonometer registers normal. Likewise, in definite glaucoma the estimation by finger tension is often higher than that which is shown by the tonometer. This observation has led me to believe that there is such a thing as a "rigid sclera," as we find one rubber ball more elastic than another. I have also found that massage to the eye with nonrigid sclera reduces tension, while it practically has no effect on the rigid sclera. It has been my impression that the eye with the nonrigid sclera was more amenable to miotic treatment.

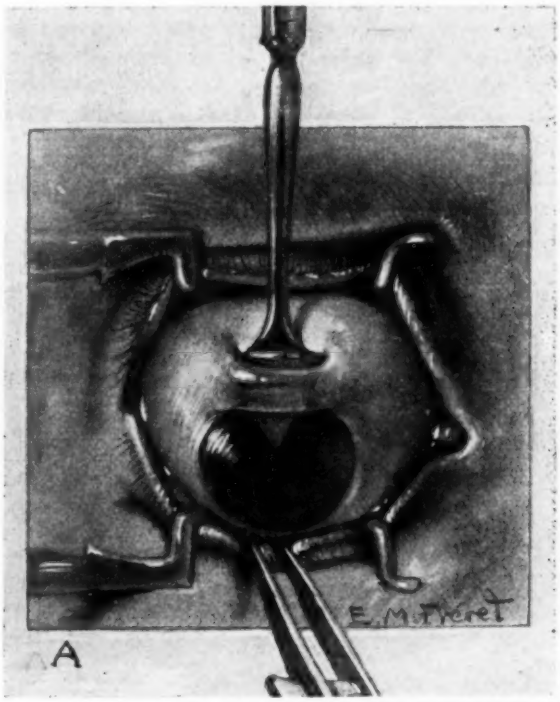

Fig. 1.—Illustrating the keratome incision made far back into the conjunctiva and sclera. (Reese).

Concerning the treatment by miotics, which must be used several times a day over a period of years, it is not desirable to immediately reduce the tension to a maximum by the use of too strong solution, but by solutions sufficiently weak to contract the pupil to a pinpoint size, and to gradually increase the strength to maintain this contraction. The strength necessarily varies with individuals.

At the beginning I employ a solution of pilocorpin nitrat, 1 grain to the ounce, to be used morning, noon and evening, and a solution of eserin

salicylat or sulphat, ¼ grain to the ounce, at bed time. As the eye becomes tolerant to its use, the strength is to be gradually increased, with consideration of the patient's comfort. This procedure avoids much of the blurring of vision during the day that might be occasioned by the use of eserin. Prescriptions should be written for small amounts, to insure fresh solutions. Massage, which is employed by means of palpation to the closed upper lid, for two or three minutes night and morning, is a great aid.

It should be remembered that a too long continued use of alkaloids in the conjunctival sac, or from the contamination of the solution, will produce an enlargement of the lymph follicles of the conjunctiva, which can be corrected by their withdrawal for a few days, and by using some mild astringent collyrium containing zinc sulphat. Also, that the continued use of strong eserin solutions may induce an iritis, and cases have been recorded where an acute glaucoma was induced from the same source. It is needless for me to add, that it is advisable and important to use weak miotics in the opposite eye, even when manifestations of the disease are absent.

Finally, miotic treatment for glaucoma simplex should only be employed in patients who can be kept under close observation, and the danger is that it may be used so long as to loose the best opportunity for operation, which is a paraphrase of de Wecker's oft quoted sentence "if miotics have never cured a case of glaucoma, they have prevented many glaucomotous patients from being cured."

From my student days, I have come to regard that in any condition where various procedures are recommended in the treatment, it is a safe conclusion that none are satisfactory. In the operative treatment of glaucoma, I am forced to this same conclusion, for the twenty or more operations which have been offered us, all are said to give satisfactory results. And in a measure that is correct, for there are many ways to accomplish the same result in lowering the increased intraocular tension, and one's individual preference must always be considered. It would be interesting and instructive if we knew how many eyes have been lost from the various operative procedures for glaucoma simplex. Successes abound, but rarely do we hear of failures.

From the time of von Graefe, it has

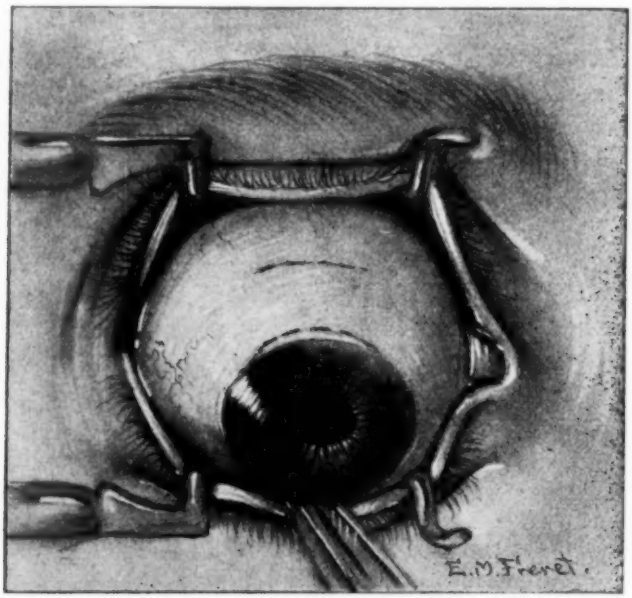

Fig. 2.—Illustrating the lines of incision in the conjunctiva and sclera, after the withdrawal of the keratome.

been generally recognized that an iridectomy did not offer the same brilliant result in the noncongestive type as in the congestive type of glaucoma, and the best results were obtained when a filtering cicatrix, a term employed by de Wecker, was formed. This fact primarily led to the conception for subconjunctival filtration, call them sclerectomy, trephine, iris inclusion or what ever you please.

The trephine operation at the corneoscleral junction, as essentially described by Elliot, has been graciously received by the ophthalmic world, and at one time or another, it has been employed by nearly every operator, who in praiseworthy terms reported his successes. We have now had ample time to digest the results and note its effects. While I do not speak with any degree of security, and my impression is gathered mainly from personal contact with various operators in widely separated sections, I believe that there is rapidly rising a feeling of dissatisfaction for the trephine operation and a desire to try something else. That it has its virtue, no one will deny. In all fairness I find some surgeons of large experience who stand by it today with the same enthusiasm and assurance, as when the operation was in its infancy. What then is the cause for this dissatisfaction? I can only speak for myself, relating my personal experience.

While my experience with the trephine operation has not been large, it has been quite enough for me to form definite conclusions; and I have had every complication, from delayed restoration of the anterior chamber and quiet iritis, to a permanent detachment of the choroid with blindness and latent infections. I shall endeavor to anticipate your thought, by saying that the Elliot technic or what is commonly practiced today was rigidly carried out, and I believe the operator possessed an average operative skill. At any rate there is consolation in knowing that similar experiences are related by other surgeons of undoubted skill. But again the operation has saved eyes when other procedures failed.

With the employment of the large thick conjunctival flap the danger of infection is reduced, but occasionally it does occur. By the adoption of the continuous suture to the conjunctival wound, producing a water tight flap, anterior chambers are more quickly

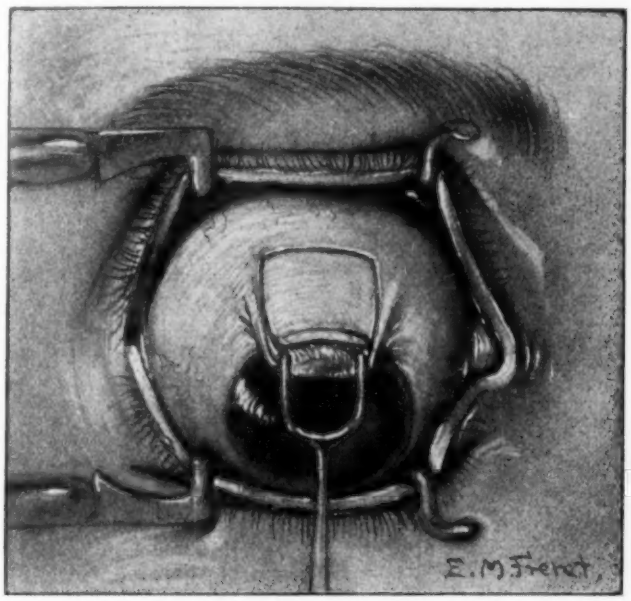

Fig. 3.—The conjunctiva is pulled forward with a Holth retractor, exposing the scleral lip.

restored, which gives me a feeling of greater security and an assurance that an iritis will hardly develop, particularly if atropin is employed. I feel that a quickly restored chamber aided by the employment of this continuous suture, gives a broader area of filtration, a point of much importance in the trephine operation. A thin, friable conjunctiva frequently seen in senile eyes is a distinct contraindication to a trephine operation. A flap of this tissue would offer inadequate protection to the scleral wound.

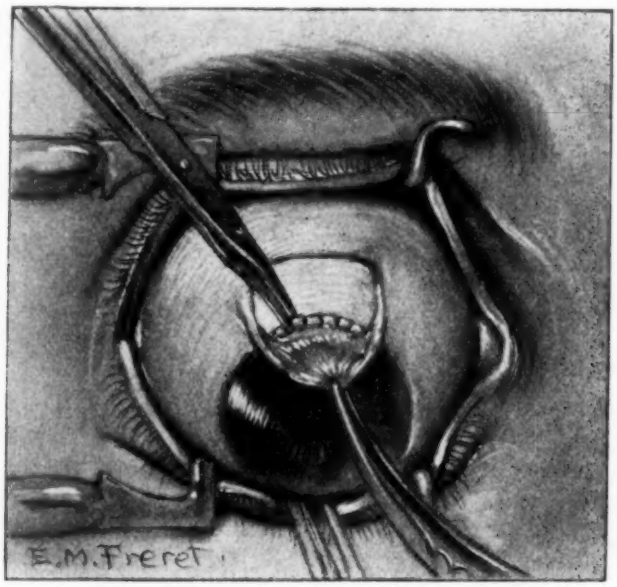

Fig. 4.—Multiple incision made into the scleral lip.

While ophthalmology owes a great debt to the originator of the trephine operation, with the lack of confidence which I personally feel toward it, I cannot with all honesty employ it routinely in glaucoma simplex, with the feeling that I have done for my patient, an operation which I would not have done on my own eye.

The operations of cyclodialysis and iris inclusion (iridotasis) I can discuss in a word, with the statement that I have not as yet employed them. Cyclodialysis seems to be most popular with those American ophthalmologists who have had their training in European clinics. It is seldom mentioned today, altho I am sure that it has its place in the surgery of glaucoma.

If our present knowledge and teaching of the pathology and surgery of the eye is sound, then in my estimation, the operation of iris incarceration, even tho covered by a thick conjunctival flap as a shield against infection is all wrong. The postoperative cases that I have seen, I should not be proud to call my own, altho, I admit that the tension was lowered. I have recently seen a severe infection. The remarkable yet alarming fact regarding this operation is that it is rapidly gaining in popularity and by a group of excellent and conservative men who should know better. However, I must withhold judgment for I may later be convinced.

The idea of subconjunctival filtration by means of sclerotomy, after the method of Lagrange, is technically correct, except for the inadequate conjunctival flap and the treatment of the anterior scleral lip. A lack of consideration of this operation is not from want of appreciation of the value of the method and the great service its originator has rendered ophthalmology in first introducing the principles of subconjunctival filtration. The underlying principles of the operation are

embodied in the procedure which I am now about to describe.

The operation of my choice is primarily a broad based iridectomy, combined with multiple incisions into the anterior scleral lip, beneath a large conjunctival bridge or flap, attempting to produce a slow filtration. The procedure offers two possible avenues of drainage, internally thru the natural channels, if they are not too firmly blocked, and externally beneath

Briefly the steps are as follows and are taken in part from his description:

A broad blade keratome is used and the point engages the conjunctiva at right angles, 7 mm. from the limbus above. It rakes or pushes the conjunctiva forward to within 2 mm. of the cornea, when the sclera is penetrated obliquely and the point of the instrument enters the chamber, anterior to the plane of the iris. The keratome is pushed into the anterior chamber

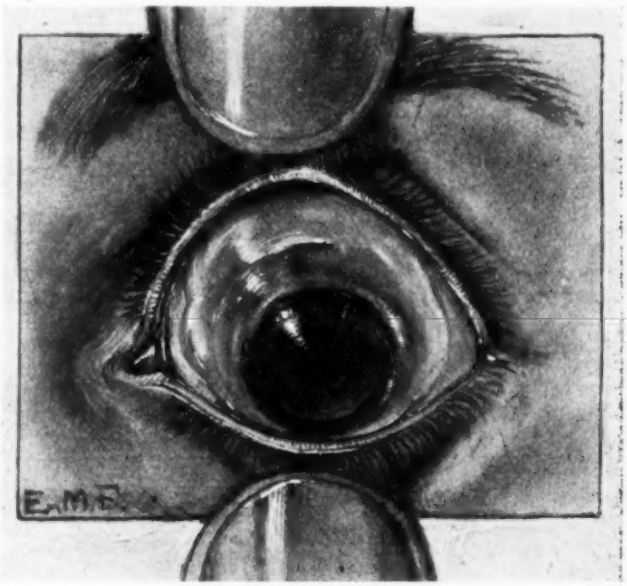

Fig. 5.—Showing the subconjunctival filtration after massage. (Reese).

the conjunctiva. The procedure is neither new nor original. Operators partial to iridectomy have advocated "a deep iridectomy," "a well placed iridectomy," or "a broad based iridectomy," which could only mean that the scleral incision must be made far back. Holth was an early exponent of this deep scleral incision; which was made with a keratome and which included a large conjunctival flap, made by an incision even more distant than the one in the sclera. The perfected operation, including the technic of the most satisfactory iridectomy that I know, is summed up in the operation described by Reese before the San Francisco meeting of the American Medical Association in 1922. I have performed this operation for many years.

for the entire length of the blade, making a broad slightly elliptic incision in the sclera that almost follows the curve of the limbus. The keratome is gently and smoothly withdrawn, often without loss of aqueous. The author (Reese) now makes lateral cuts to the retracted conjunctiva upward and backward to allow the conjunctiva to be more easily displaced forward. Often this can be as easily accomplished by using Holth's conjunctival retractor, designed especially for this purpose. Under no circumstances should the conjunctival flap be dissected as in other flap operations, on account of producing two raw surfaces which will ultimately adhere, defeating the purpose of broad filtration.

The iris, being withdrawn and everted, is pulled slightly to the left;

and with slightly curved iris scissors, the concavity facing the right, a cut is made in the iris to the right of the forceps, backward to the ciliary body. The iris is drawn backward and if the ciliary attachment has not been torn loose, a second cut is made with the concavity of the scissors upward, and the blades are firmly pressed against the posterior lip of the scleral wound. Finally the iris is drawn forward and to the right and with the scissors pressed against the sclera, and the conjunctival flap displaced over the cornea by a cotton pledget, the third cut is made producing a broad based coloboma. The pillars usually recede into place of their own accord, without the use of the spatula. Reese clips off the anterior lip of the sclera with strong scissors or Holth's forceps. My procedure is to make several deep incisions with Stevens' scissors into this scleral lip, so that there may be several possible avenues of aqueous escape instead of thru one slit or hole.

The after treatment is most essential. It consists chiefly in massage, begun at the first dressing if the chamber is restored, and continued by the surgeon for two weeks, with instructions to the patient to practice it twice a day for at least one month. The massage prevents intentional and early healing of the sclera; and it is my belief that ultimately the many small incisions into the sclera lip will become lined with endothelium, forming several avenues for permanent filtration. After massage one can see the circumcorneal conjunctiva bleb up by the escaping aqueous, which will often continue after massage for several weeks.

Atropin is rarely used at the time of the operation as the pupil remains slightly dilated, and miotics are not begun until the eye becomes quiet and I am sure that an iritis, an infrequent complication, has not developed.

The chief advantages of the operation are first safety, and second the double facilitation of drainage. Where there is a return of tension the operation is repeated, or a trephine is done as a means of last resort.

GONORRHEAL OPHTHALMIA TREATED WITH ACRIFLAVIN. ACTIVATION OF BACTERICIDAL ACTION OF THIS DYE.

W. B. Wherry, M. D.

CINCINNATI, OHIO.

This is a single case carefully observed with reference to modifications in its treatment. Laboratory studies are also reported, which seem to throw important light on the conditions that favored the bactericidal action of the drug. These studies were made in the Department of Bacteriology and Preventive Medicine, University of Cincinnati.

The patient was referred for diagnosis on the tenth day of the disease, December 11, 1924, as there was no improvement under ordinary methods of treatment. The pupil was dilated (atropin). There was extreme congestion and edema involving the conjunctiva and the loose tissues about the eye. The eye was filled with a creamy pus and the discharge was so profuse that the patient twice caught the pus as it fell from the eye during the examination. Smears showed numerous gramnegative diplococci resembling the gonococcus. Cultures yielded numerous colonies on dextrose ascites agar when grown against B. coli. Numerous cultures from the eye failed to grow aerobically. The coccus produced acid from dextrose but not from lactose, saccharose, maltose and mannite. No other bacteria appeared thruout the period of treatment.

We decided to treat the case with acriflavin. While Small[1] had used one drop of a 2 per cent solution and kept this in the eye for 2 minutes for the demonstration of corneal ulcers, without any harm, we were unaware of this at the time and began with a 1-5000 watery solution. A few drops were instilled at 5 minute intervals, every 4 hours, December 12 and 13. This did not diminish the number of cocci. A continuously applied wet

dressing of strong magnesium sulphate had reduced the edema.

During December 14-15 several drops of 1-2000 acriflavin were instilled every 5 minutes for 30 minutes and this was repeated every 4 hours. The wet dressings were applied continuously. Now the eye was open; there was no edema; and the pus had almost disappeared; it appeared as tho recovery would follow. However, the microscope still showed the presence of gonococci, and on December 16-17 the discharge became profuse again and the edema of the lids returned.

Frequent smears and cultures made during this period of the treatment showed that the 1-2000 solution (greatly diluted in the eye) had exerted a poisonous effect on the cocci, for the cultures grew very slowly and never reached the luxuriance shown by cultures of unpoisoned cocci. Then, corresponding with the period when the purulent discharge reappeared, in spite of the continued presence of the dye, the cocci again grew just as luxuriantly and promptly as they had before. This period of poor growth was not due to unfavorable media as the same lot was used thruout the experiment. The sudden resumption of the ability to grow luxuriantly in spite of the continued presence of the dye seemed to indicate the development of a dye fast strain; but could be explained just as well by the greater dilution of the dye, owing to the increase in the amount of the exudate. Gay and Morrison[3] confirm the findings of Browning and Gulbransen to the effect that growth in nonlethal concentrations of dyes does not lead to the production of dye fast strains of bacteria, at least in test tube experiments.

The dye treatment was discontinued for 24 hours, December 18-19, and instillations of 25 per cent argyrol substituted. This in no way affected the character of the disease.

On December 19 treatment with acriflavin 1-1000 was instituted as follows: 12:30 P. M. 3-4 drops every 15 minutes for 2 hours; 3:30 P. M., 3-4 drops every 5 minutes for one-half hour; and this was repeated at 7 and 11 P. M. and continued at 5:30 and 11:30 A. M. on December 20. The purulent discharge ceased towards the morning of December 20 and did not return. Two treatments were given on December 21 and one on December 22 with the idea of preventing recurrence. The residual congestion of the conjunctiva disappeared in a few days.

REMARKS ON THE CASE.

There is one fact to be considered in coming to the conclusion that acriflavin alone brought about recovery. Instructions to add sodium chlorid to the magnesium sulphate wet dressing were not carried out until December 19, and so, during the period of recovery this treatment was combined with the use of acriflavin. It is certain that the edema produced by the products of bacterial metabolism results in putting proteins in solution and so favors their further growth in the tissue spaces; and that the reduction of this edema not only interferes with bacterial nutrition, but at the same time allows the normal defensive mechanism of the body to come into play again.

This aspect of infection and immunity is worth consideration. In dealing with any conception of immunity one must first take into consideration whether any given microorganism is provided with the necessary ferments which will enable it to utilize the sources of carbon and nitrogen present in a host's tissues; and whether it can grow in the absence of free oxygen, or at oxygen tensions much below that in the atmosphere, or at the temperature of the host. Then one must conceive that the microorganism is provided with the necessary mechanism which will enable it to set water free from its state of combination with the colloids, thus putting the food substances in solution and so making them available for its use. This conception of course is based on the well known experiments of M. H. Fischer on colloids and colloidal solutions.

In the growth of bacteria in solid culture media, it is a well known fact that the rate is in inverse ratio to the concentration of a colloid capable of

holding water like agar-agar. If one plates a bacterium like B. pyocyaneus in nutrient agar-agar of varying concentrations, but of the same composition and reaction, it multiplies most rapidly in such concentrations as 0.2 per cent or 0.5 per cent and scarcely at all or very slowly in 3 or 4 per cent. The well known Hiss' method of differentiating typhoid colonies from those of B. coli, by plating in media containing a low concentration of agar-agar and gelatin depends on the same principle.

It is only after we have considered and disposed of such initial stages in the process of infection and immunity that we are warranted in calling into account the function of the later phenomena of immunity, such as the action of bactericidal, lytic, and opsonic substances, and that of the phagocytic cells.

If there is any truth in the conception that the initiation of infection is dependent on the freeing of water from the colloids, thru bacterial action, or thru other types of trauma, then measures directed towards dehydrating the tissues should tend to check infection and the success of such measures would most likely depend upon one's ability to bring about the necessary dehydration.

G. E. Rockwell has shown (still to be published) that sodium chlorid exerts a marked influence on the penetration of the more powerfully dehydrating salts into tissues. For example, very little magnesium sulphate will penetrate into steer hide, unless considerable amount of sodium chlorid is present. Again, magnesium sulphate alone is not absorbed from the stomach of a rabbit, but if accompanied by sodium chlorid the rabbit goes to sleep; and if the dose is large enough it dies of magesium poisoning. Since I have seen anthrax of the eye in man cured in 24 hours, staphylococcus infection of the eye lids, erysipelas and extremely edematous streptococcus sore throats subside rapidly when the accompanying edema was reduced, it is quite probable that the combined salt wet dressings played an important part in recovery.

EXPERIMENTS ON ACTION OF ACRIFLAVIN ON GONOCOCCUS.

A loopful of a dense suspension, of a 24 hour partial tension culture of the gonococcus, was inoculated into 1 or 2 cc. of the dye dilutions. One loopful was subcultured at intervals upon dextrose ascites agar slants, which were incubated at partial tension at 37° C. Notes were made for several days in order to rule out mere inhibition. There was no inhibition of the subcultures, except in a few instances where a few scattered colonies appeared after 24 hours and before 48 hours. It will be noted that the lethal action is just as effective at 16° C. as at 37° C.

Experiment 1. Showing the time it takes 1-2000 acriflavin to kill the gonococcus and the influence of alkaline salts. Temperature 37° C.

		15 Min.	30 Min.
1.	0.25 cc. Pleural fluid.....		
	0.25 cc. 0.85% Na.Cl.....	+	—
	0.5 cc. 1-1000 acrifl.....	—	
2.	0.25 cc. Pleural fluid.....		
	0.25 cc. 0.01% Na_2CO_3...	+	+
	0.5 cc. 1-1000 acrifl.....	—	—
3.	0.25 cc. Pleural fluid.....		
	0.25 cc. 1% Na.HCO_3....	+	
	0.5 cc. 1-1000 acrifl.....	—	—
4.	0.25 cc. Pleural fluid.....		
	0.25 cc. 1% $Na_2H.PO_4$...		
	0.5 cc. 1-1000 acrifl.....	—	—
5.	1. cc. 0.85% Na.Cl.....	++	++

++ = numerous colonies.
+ = very few colonies.
— = no growth.

It will be noted that in the presence of one-fourth volume of a thick pleural fluid 1-2000 acriflavin surely kills all the gonococci in 30 minutes; and in the presence of 0.25% $Na_2H.PO_4$ in 15 minutes.

Experiment 2. Showing that the presence of 0.33% basic sodium phosphate makes the lethal effect of 1-3000 acriflavin complete in 15 minutes. Temp. 16° C.

		15 min.	30 min.
1.	0.5 cc. Pleural fluid....		
	0.5 cc. 1% Na_2 $H.PO_4$..	—	—
	0.5 cc. 1-1000 acrifl. ...		
2.	0.5 cc. Pleural fluid....		
	0.5 cc. 1% Na_2 $H.PO_4$..	++	++
	0.5 cc. Distilled water .		
3.	0.5 cc. Pleural fluid....		
	0.5 cc. Distilled water..	+	+
	0.5 cc. 1-1000 acrifl. ...		
4.	0.5 cc. Pleural fluid....		
	0.5 cc. 0.1% Na_2 $H.PO_4$	+	+
	0.5 cc. 1-1000 acrifl. ...	—	—
5.	0.5 cc. Pleural fluid....		
	0.5 cc. 0.01% Na_2 $H.PO_4$	+	+
	0.5 cc. 1-1000 acrifl.....	—	—

It will be noted that the basic phosphate, alone, did not kill. Even 0.0033% basic phosphate increases the germicidal action.

Experiment 3. Showing that 1-4000 acriflavin in one-half volume pleural fluid kills in 15-30 minutes. Temperature 18° C.

		15 min.	30 min.
1.	1 cc. Pleural fluid....		
	0.5 cc. 0.01% $Na_2 H.PO_4$	+	+
	0.5 cc. 1-1000 acrifl.....	—	—
2.	1 cc. Pleural fluid....		
	0.5 cc. distilled water..	+	
	0.5 cc. 1-1000 acrifl.....	—	—
3.	1 cc. Pleural fluid....		
	0.5 cc. 0.01% Ca. Cl_2...	+	
	0.5 cc. 1-1000 acrifl.....	—	—
4.	1 cc. Pleural fluid....		
	1 cc. Distilled water..	++	++

EXPERIMENTS ON B. PYOCYANEUS, B. MUCOSUS AND B. COLI

A loopful of a dense suspension from a 24 hour agar slant culture, was inoculated into 1 or 2 cc. of the dilutions to be tested; and subcultures of one loopful planted on agar slants, or in 10 cc. of broth. Vigorous young cultures were used in the experiments reported, for in some experiments, where 4 or 5 day old cultures were used, the bacilli were found to have but little resistance to the dye.

Experiment 4. This showed that 1-1000 acriflavin in 1-2000 sodium salicylate kills B. pyocyaneus in 4 minutes, or less; whereas 1-100 acriflavin alone kills in 15 minutes. 1-1000 sodium salicylate does not kill in 60 minutes.

Experiment 5. A solution of 1-1000 acriflavin in 1-1000 sodium salicylate kept for one month, turned a darker color, but was still active for it killed B. pyocyaneus in 2 minutes at 25° C.

Experiment 6. The amount of salicylic acid present in a 1 per cent sodium salicylate solution, i. e. 0.8659 gm. was dissolved in 1 cc. of sterile water by boiling. Tests with dilutions of this showed that B. pyocyaneus is killed in 15 minutes, by a 1-1000 solution. A dilution of 1-10,000 does not kill in 15 minutes.

While it took 1-1000 acriflavin 15 minutes to kill, a mixture containing 1-1000 acriflavin and 1-200,000 salicylic acid, killed in 5 minutes.

Experiment 7. A 1-20,000 dilution of acriflavin alone, or of sodium salicylate alone, does not kill B. pyocyaneus in 60 minutes; but a mixture containing a 1-20,000 dilution of each kills in 45 minutes.

Experiment 8. Acriflavin 1-1000 killed B. pyocyaneus in 10 minutes. A recently isolated encapsulated strain of B. mucosus was killed between 30-60 minutes—the subcultures after 10 minutes showed innumerable colonies, that after 30 minutes 2 colonies and the agar slant and broth remained clear after 60 minutes. B. coli, from cystitis, was not killed in 60 minutes, altho the number of colonies was reduced from innumerable after 10 minutes to 30 after 60 minutes. Davis and Harrell[5] found that it takes one hour for a 1-200 dilution to kill B. coli in acid urine, but only 1-1000 is necesary in alkaline urine.

DISCUSSION.

Browning and Cohen[3] state that the "sterilizing concentration" of acriflavin, for the staphylococcus, is 1-100,000 in water and 1-200,000 in serum; and for B. coli 1-20,000 in water and 1-100,000 in serum, with some variations. It would seem that by sterilizing concentration they must mean the inhibiting concentration. They tested a large number of preparations of the dye, and while some were more irritating than others they all had about the "same bactericidal action." Davis[4] found that it takes a 1-5000 solution to inhibit the growth of B. coli in acid urine, but a 1-100,000 solution inhibits in alkaline urine.

According to Davis and Harrell (loc. cit) 1-300,000 acriflavin inhibits the growth of the gonococcus in protein containing media. This inhibitory action is 600 times that of protargol. They also showed that the dye penetrates the urethral and bladder mucosa, reaching the muscular layer. Following single daily irrigations of 1-250 or 1-1000 solutions they report cures of both anterior and posterior gonorrhea in the male, in from 2-14 days.

Watson[6] treated gonorrhea in the male by twice daily irrigation of the anterior urethra with a pint of a 1-4000 solution in normal saline. The average time for cure in 196 uncomplicated cases was 15.4 days. A case was considered cured if there was no relapse in

4 days. He states that gonococci exposed to a 1-4000 solution are killed in 2 minutes. In my experiment it took 30 minutes for a 1-4000 solution to kill in the presence of one-half volume of pleural fluid.

Experience seems to point to the fact that the dyes so far used for killing bacteria in the animal body must exert their bactericidal action quickly, and then be excreted soon afterwards, in order to avoid damage to the tissues. I have noted that when rabbits receive intravenously a maximum nonlethal dose of acriflavin, or of Gentian violet, soon after inoculation with pneumococci they die sooner than controls inoculated with pneumococci alone. Similar experiences are reported in experiments with acriflavin and the hemolytic streptococcus by Melency and Zung Dan-Zau[7].

Quickly bactericidal concentrations of acriflavin alone are harmful to the animal body, and the only way out seems to lie in the possible activation of the dye. It will be noted in the above experiments, that even 0.0033 per cent of basic sodium phosphate activates; and if it be claimed that this is a matter of alkalinity, then this explanation cannot hold for the activation produced by 1-200,000 sodium salicylate and salicylic acid.

SUMMARY AND CONCLUSIONS. A case of acute gonorrheal ophthalmia was promptly cured by the instillation of a few drops of 1-1000 acriflavin at short intervals. The cure was probably aided by wet dressings of strong magnesium sulphate and sodium chlorid, which reduced the edema.

In the presence of one-fourth to one-half volume of a thick pleural fluid, 1-2000 acriflavin kills the gonococcus in 30 minutes and the time necessary to kill is markedly reduced by small quantities of basic sodium phosphate.

It takes 15 minutes for 1-1000 acriflavin to kill B. pyocyaneus; but this time is greatly shortened by small quantities of basic sodium phosphate, sodium salicylate and salicylic acid; while 1-20,000 dilution of acriflavin alone, or of sodium salicylate alone, does not kill B. pyocyaneus in 60 minutes, a mixture containing a 1-20,000 dilution of each kills in 45 minutes.

A 1-1000 solution kills B. mucosus, some time between 30-60 minutes; all of the B. coli in a suspension are not killed in one hour, under the conditions of the experiments, by a 1-1000 dilution.

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INFLAMMATION OF THE CORNEA CAUSED BY SOLUTION OF SILVER NITRATE.

DR. JULIUS FEJER.

BUDAPEST.

Use of ten percent solution of silver nitrate, by a midwife, to prevent ophthalmia neonatorum, caused some opacity of both corneas; and permanent impairment of vision in one eye. The solution prescribed by the Hungarian regulations is of silver acetate, 1 percent, which cannot increase in strength by evaporation. Instances of similar injury are cited from the literature.

In 1914, on the evening of October 14, I was called to see an infant who was born at noon the day before. The process of the birth was normal. After the birth the midwife, according to written legal orders, took from her handbag a phial containing a solution of silver nitrate, from which she dropped a few drops into each eye of the infant. The physician present assisted her while she accomplished this work, holding the eyelids meanwhile. The physician perceived at once that the solution of nitrate of silver colored deeply the eyelids, as well as his fingers that had been holding them. That is, the solution had burnt them.

When we forced apart the swollen eyelids, we noticed at once that both of the corneas were cloudy, rough and dim, especially the left cornea, and very severely. Ciliary injection, however, did not appear. The case became quite clear to me and to my colleague at once. We suspected immediately, that not 1% nitrate of silver had been dropped into the eyes, but a very much stronger solution. This was indicated by the circumstance that the drops had colored the skin of the infant's eyelids as well as the fingers of the attending physician; and also that the swelling of the eyelids, the dimness of the cornea, and roughened state did not correspond with the secretion that was present. We had the solution from which the drops had been used examined in a laboratory, where the discovery was made that the phial contained a 10% solution of silver nitrate. On questioning, the midwife confessed that her solution having been used up, she went into a drugstore and asked for a solution of nitrate of silver; and the druggist, without any prescription and upon her mere request gave her a solution of 10% silver nitrate.

I observed the little invalid thruout many months. The right cornea in the lower, inner quarter began to get irregular; the left cornea became dimmer and dimmer, and always more roughened. I tried to influence the course of the disease by applying warm compresses with cautious droppings of atropin and dionin drops, which partly proved a success.

Three months after the injury there was observed: a round diffuse opacity —as large as the head of a pin, in the lower, inner quarter of the right cornea; above which, the epithelium was completely smooth; the fundus of the eye could be seen very well. In the middle of the left cornea there was an opacity, formed by many opaque parts and lying horizontally. These parts are in the deeper layers of the cornea, are covered by smooth epithelium and obstruct the penetration of the light rays greatly. With a mirror, red reflex could be obtained, but the fundus of the eyes could be seen but dimly.

The sight of the right eye was perfect, I believe; but the sight of the left eye could not be more than 0.4. The decrease of working capacity of the child was at least 20%, in consequence of the remaining spots in the corneas of both eyes. It is fortunate that he did not become entirely incapable of work.

The Hungarian Midwife Book, 1912, precisely prescribes that midwives—besides the above mentioned orders regarding drugs and instruments—must keep in readiness a dark colored bottle furnished with glass stopper, containing 1% solution of argentum aceticum; and under a separate cover an eye dropper with a rubber end, which must be kept in good condition and permanently clean. The midwife—after the newly born infant's eyelids are washed —must drop one drop from the 1%

solution of argentum aceticum between the infant's updrawn eyelids with the eye dropper, that had been thoroly cleansed before, outside and inside, with tepid water. The attending physician alone can absolve her from this. The midwife who fails to use these drops commits a misdemeanor. Thus, the legal order is precisely laid down.

The examinations of Zweifel and afterward that of Scipiades, showed that the silver acetate prevents the trouble just as well as the dropping a 2% silver nitrate solution into the eye, causes less catarrh and does not concentrate by standing. Lastly, what is most important, in a room temperature it is only soluble to 1% quantity. If it contains more than 1% silver the superfluous quantity of salt is precipitated and settles at the bottom of the phial. Thus, there can be no trouble, even if the druggist should make a mistake, by giving a stronger solution. In consequence of no mistake, there has been trouble regarding silver nitrate because its solution, by long standing, on account of the evaporation of the water, increases its concentration. We must reckon with this circumstance, because we must consider how long a phial, containing 20 grams nitrate solution, can remain in use.

In the above intensive discussions of Scipiades, we find mention in the literature regarding the harmful effect of dropping 2% solution of silver nitrate into an infant's eyes.

Kruckenberg observed the cornea becoming dim after the midwife had dropped in silver nitrate, but this was cured after a proper treatment.

Wilbrand too, observed two similar cases and Elschnig published three cases where, in consequence of the crystallizing of silver nitrate, the cornea became sclerosed thruout.

Recently, Roth and Schascher communicated cases, arising thru the mistakes of druggists who had given 10% or 20% silver nitrate solution. After the drops had been applied, severe conjunctivitis set in, with milk-white veiling of the cornea and with sloughing of bloody fibers, so that the eye could be saved only thru the most careful treatment by the physician.

How right those observers were, who did not want to permit the 2% silver nitrate in the hands of midwives to drop into the newly born infant's eyes, is shown by the fact that 1% silver acetate solution is prescribed and yet they go into any drug store and ask for solutions of nitrate of silver. What concentration the solution should have and what it should contain whether argentum aceticum or argentum nitricum they do not care. By all means I deem the druggist the greater sinner; who deals out—upon mere request, without physicians' prescriptions —drugs which are labled with a cross. The midwife could have a prescription given her by any physician or official doctor.

My only aim in communicating the present case was, that my colleagues may see what a severe effect may be produced in the cornea by dropping on it 10% silver nitrate solution; and to draw the attention of the authorities to the druggists and midwives, and what errors they are capable of committing.

MELANOSIS OCULI. A CASE WITH MICROSCOPIC FINDINGS.

A. B. Reese, M.D.

NEW YORK CITY.

The eyeball here described was enucleated on account of a tumor seen in the vitreous. This gave opportunity for the microscopic study of melanosis of the eyeball, a condition not previously thus investigated. It is potentially dangerous, but not necessarily malignant. Studied under Dr. A. Fuchs at the Meller Clinic of the Allegemeines Krankenhaus, Vienna.

There have been 26 cases of melanosis oculi recorded since 1861. In view of the fact that none of the reports includes microscopic findings the writer feels warranted in presenting this case.

History. Female, age 65, native of Czecho-Slovakia. She complained of the sensation of a veil before her right eye. The sight in this eye had grown progressively worse during the preceding three months.

Clinical examination. The patient is a brunette. The sites where pigment is normally found (skin, areolae of the breasts, mucosal surfaces, etc.,) are well within normal limits.

Right eye. The intermarginal portion of the lower lid has 15 or 20, sharply demarcated, light brown pigment spots, the size of a millet seed. There are numerous dark brown pigment spots and streaks in the palpebral conjunctiva, along the lower lid border, and a black streak of pigment in the retrotarsal fold. The conjunctiva, especially around the limbus, shows a light brown granular pigmentation. In the anterior portion of the sclera there are numerous small spots of pigment, which are in part blackish brown and in part grayish brown, some of which correspond to the sites of the emissary vessels. The iris is almost black and the surface markings indistinct.

There is light sensation at 15 feet; faulty projection above and to the nasal side. The pupil reacts to light from the nasal and temporal sides. Ophthalmoscopic examination shows the disc to be normal, except for a brownish hue. The fundus is intensely dark, especially around the disc. There is a large tumor mass projecting into the vitreous from the inferior temporal region. The surface of the tumor is mottled with pigment. Tension of the globe is normal.

Left eye. Examination is negative. There are no areas of pigmentation in the lids, conjunctiva or sclera and no increase of pigment is evident from the fundus examination. The iris is much less pigmented than that of the right eye.

The right eye was enucleated and fixed in formalin.

Macroscopic Examination. The dimensions of the right eye are normal. Pigment spots are evident over the entire scleral surface especially in relation to the posterior ciliary vessels and nerves. There are areas of pigmentation in the extraocular muscles, especially in the inferior oblique.

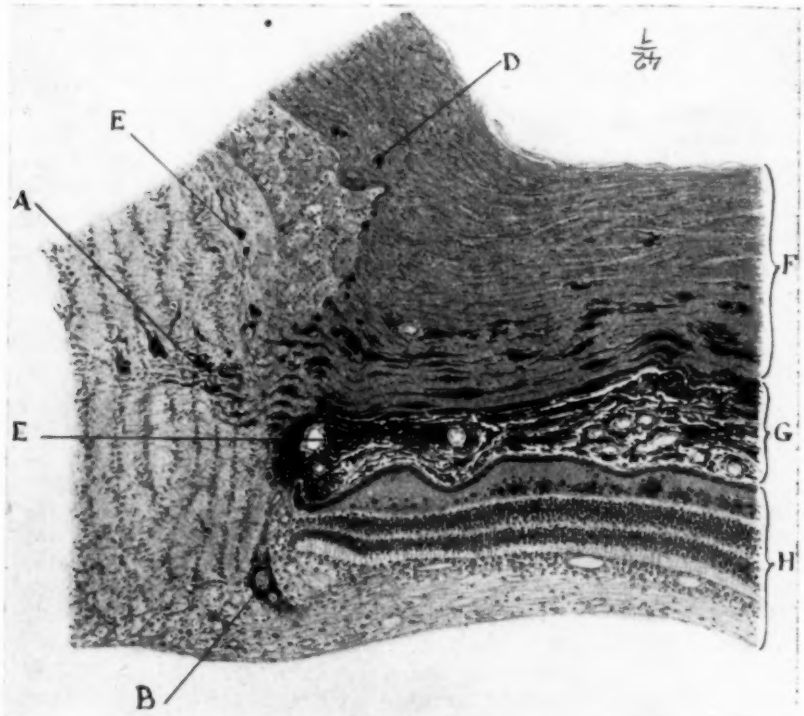
Microscopic Examination. The eye was imbedded in celloidin and cut in serial sections. The stains employed were hematoxylin and eosin, Van Gieson and depigmenting preparations (permanganate and oxalic acid method).

Cornea normal. *Sclera.* The external lamellae contain a few chromatophores. The internal lamellae, lamina fusca, and suprachoroidal lamellae are intensely pigmented, especially around the posterior pole and the emissaria. The lamina cribrosa, particularly that part designated as the lamina choroidea, is in part densely pigmented, so that its course thru the optic nerve stands out as if some differential stain had been employed. (Fig. I). Chromatophores are also scattered thruout the pia and dura. Between the bundles of the inferior oblique muscle, there are accumulations of chromatophores, some of which completely surround the bundles (Fig. IV).

Schlemm's canal. The contour of the canal is outlined by a black well-demarcated layer of pigment (Fig. II). The pigment is in chromatophores under the endothelium, and there is no evidence of phagocytosis. There is no free pigment in the canal. The walls of the anterior ciliary vessels are pigmented in a manner similar to that of the canal.

Pectinate ligament. Chromatophores are scattered thruout the trabeculae,

but are more numerous in the region of the scleral spur. In some sections chromatophores are seen stretching along the surface of the ligament. Usually they are isolated groups of cells, without connection medially or laterally with other chromatophores; but of the chromatophores in the stroma have acquired so much pigment, that they are globular in shape and show no pigmented processes, as seen in typical chromatophores. However, all gradations are seen, from these globular shaped chromatophores to the typical



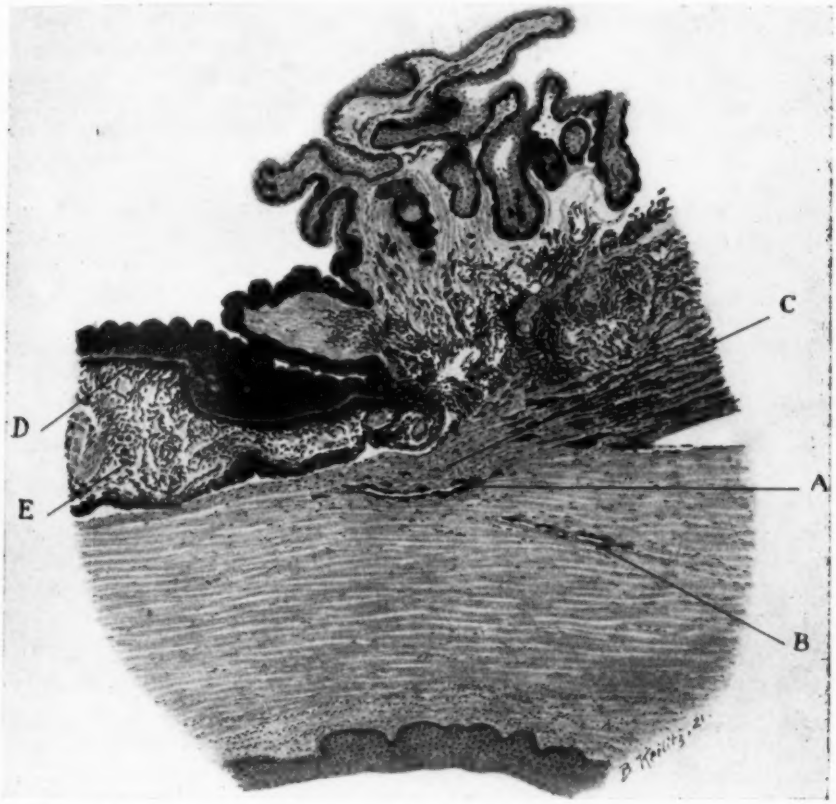
1. The temporal side of the disc including the adjacent portion of the retina, choroid and sclera.
A. Pigmentation of the lamina cribrosa.
B. Distal or retinal portion of pigmented cilioretinal artery.
C. Proximal or choroidal portion of cilioretinal artery.
D. Pigment in the dura.
E. Pigment in the pia.
F. Sclera showing pigmentation lamina fusca and inner lamellae.
G. Choroid.
H. Retina which is detached, and between it and the pigment epithelium there is albuminous fluid in which are floating pigment epithelial cells.

sometimes they have a direct continuation with the anterior limiting layer of the iris and constitute the socalled trabeculum corneoiridicum. There is no free pigment in the sinuses of the ligament, and no phagocyted pigment.

Iris. The general contour of the iris is normal and the crypts are numerous and well defined. The anterior border layer is represented by a ribbon of pigment, so thick and dense that it resembles the pigment on the posterior surface of a normal iris. This pigmented anterior layer becomes gradually thick toward the pupillary border. Some branching type, depending on the amount of pigment they contain. In the former type the pigment is packed so densely that the nucleus is not visible, except in depigmented preparations.

These mesodermal chromatophores resemble very closely the ectodermal clump cells, which have their origin from the anterior layer of the pigment epithelium, and are mostly seen in the region of the pigment spur. The posterior border of the iris is represented by 3 layers—the most posterior being the black retinal epithelium; anterior to this the eosin staining dilator

muscle layer, and anterior to this a layer of chromatophores which abut on the dilator muscle fibers in the same manner as long narrow steel fragments assume toward a magnet. This arrangement is more marked toward the periphery of the iris. The blood vessels show a thick hyaloid adventitia which contains and is surrounded by concentrically arranged chromatophores. Also, the intima, just under the endothelial lining, shows similarly arranged chromatophores (Fig. III).



2. Section thru globe at filtration angle.. Anterior chamber artificially lost.
A. Pigmented Schlemm's canal.
B. Pigmented anterior ciliary vessels.
C. Pigmented pectinate ligament.
D. Note arrangement of chromatophores toward the dilator muscle layer.
E. Globular shaped chromatophores.

Choroid. The dense pigmentation of the choroid is greatest in the outer half and surrounding the disc. The choriocapillaris is only slightly pigmented. On the temporal side at the equator there is a mushroom shaped melanosarcoma which extends to the sagittal axis. The constriction or neck of the tumor (which gives it the mushroom shape) corresponds to the place where the growth has broken thru the lamina vitrea. The tumor has surprisingly little pigment, in comparison to the pigment elsewhere in the eye. There is no extension of the tumor thru the sclera.

Ciliary Body. The bundles of smooth muscle appear small between the densely pigmented stroma. The chromatophores in the vascular layer of the corona ciliaris abut on the inner surface of Mueller's muscle, in a manner similar to their arrangement on the dilator muscle layer in the iris. The narrow vascular layer of the orbiculus ciliaris is unpigmented, but the pigment epithelium extends into it in the form of numerous indippings or processes, which forms a very marked reticulum of Heinrich Mueller. At the ora serrata the pigment epithelium ex-

tends backward, along the surface of the retina, and forward along the surface of the orbiculus ciliaris.

Retina. There is a detachment, confined to the immediate vicinity of the tumor, except on the medial side where it extends to the disc, involving the macula. The portion of the retina which rests on the surface of the tumor contains numerous cysts some of which contain blood. At its apex the tumor mass has penetrated the retina, and rests against the vitreous. The pigment epithelium which covers the surface of the tumor around its base has proliferated. A large number of free pigment epithelial cells, and free epithelial pigment, are seen in albuminous fluid under the retina.

Papilla. There is no pathologic excavation, the lamina cribrosa being in the normal position. On the temporal side of the disc there is an artery, which can be traced from the choroid into the retina, the adventitia of which contains chromatophores, and is therefore a pigmented cilioretinal artery. After this vessel enters the retina it loses its pigmentation (Fig. I-B and C.).

In this case it is important to differentiate congenital from secondary pigmentation. The former occurs either in long or branching chromatophoric cells, or in pigment epithelial cells. The latter occurs as phagocyted pigment, in leucocytes and endothelial cells; as free pigment, and as metastatic cells from a melanotic growth. In this case all pigmentation present was congenital in nature. There was no phagocyted pigment, or dispersement of free pigment in the anterior chamber, in the filtration angle, the pectinate ligament, or in Schlemm's canal. There were no metastatic tumor cells present, intraocularly or extraocularly.

Of the 26 reported cases of melanosis bulbi, 3 had extraocular and 4 intraocular melanosarcomas. So, including this case, 8 out of 27 recorded cases or 29% have had sarcoma. Of course, this frequency relates to reported cases only but in view of the fact that all the reports regarded the presence of the melanosarcoma as incidental to the manifestations of melanosis bulbi, the writer feels that this percentage is approximately correct. Assuming this to be true, then melanosis bulbi is potentially a dangerous condition. Altho, it is congenital in nature and somewhat hereditary, the sarcoma does not develop until late in life. The youngest was 34 years of age, and the others ranged from 50 to 65.

The fact that the lamina cribrosa is densely pigmented with chromatophores is of practical interest. For it

Fig. 3.—Blood vessels of the iris showing the thick adventitia containing concentrically arranged chromatophores. Similarly arranged chromatophores are seen in the intima.

probably explains the nature and location of some of the pigment spots and areas of discoloration, seen at times in the disc with the ophthalmoscope. The fact that the pigmentation of the lamina cribrosa occurs in that part arising from the choroid, namely the innermost lamellae, makes it more accessible to view with the ophthalmoscope. Liebreich[1], who called the condition "cyanosis bulbi" in 1863, reported a case in which "tuft like black striae" were seen by the ophthalmoscope in the papilla. This was, in all probability, pigment in the lamina choroidea portion of the lamina cribrosa.

All cases of melanosis bulbi have occurred in brunettes, and there is no record of any in the negro. It is interesting to note that, altho sarcoma is prone to develop in a melanotic eye, its frequency in the negro eye is no greater than in the caucasian. Some of the manifestations of pigmentation in melanosis oculi are also seen normally in the negro eye; but to a less marked degree. For instance, in the negro eye it is common to see pigmentation of the bulbar and palpebral conjunctiva, foci of pigment in the episcleral and scleral tissue, particularly at the sites where the emissary vessels are transmitted thru the sclera; and accentuation of pigment elsewhere in the globe at sites where it is normally found in a less degree.

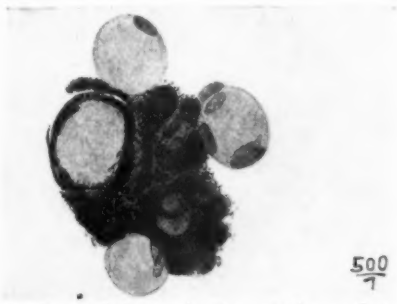


Fig. 4.—Accumulations of chromotophores between and encircling some bundles of the inferior oblique r.u. cle.

Melanosis is easily differentiated from heterochromia. In the former condition the darker eye is the pathologic one, and in the latter condition the lighter eye. Heterochromia[2] also usually shows manifestations of a low-grade cyclitis, such as deposits on the posterior surface of the cornea, vitreous opacities together with a complicated cataract in some cases. There may also be a choroiditis or glaucoma present. In melanosis the intense intraocular pigmentation together with the extraocular pigmentation of the lids, conjunctiva, sclera and episclera makes the diagnosis clear.

Streaks of pigment may appear on the posterior surface of the cornea in otherwise normal eyes. Such cases have been reported by Waardenburg[3-4] and Ezell[5]. The pigment appears as brown streaks, stripes or stipples coursing across the posterior surface of the cornea and more marked in the pupillary area. The condition is usually bilateral. Waardenburg's explanation of this is that when the anterior chamber is formed, just before birth, the pupillary membrane and iris, which have been in contact with the posterior surface of the cornea, leave some of their tissue deposited there. This tissue, which is potentially chromatophoric, later on becomes pigmented by the growth of chromatophores. This condition, which has been called melanosis of the cornea, is in no way related to the socalled melanosis oculi reported here.

Melanosis oculi was unilateral in 94% of the recorded cases, and the melanotic eye was myopic in 80% of the cases in which the refractive state was given. In the case reported by Coats, the iris showed minute, discrete hemispherical pigment prominences or papules, on the anterior surface. Also, in a case reported by Kubochi[7], there was bilateral melanosis of the irides, which showed warty prominences on their anterior surfaces. The case reported by Coats and that reported by Hudson[8] both showed nevi of the skin of the face, on the side on which the melanosis oculi was present.

Resumé. This is a typical case of melanosis oculi which was unilateral and the eye of which contained a melanosarcoma of the choroid. The extraocular tissue which showed pigmentation were the intermarginal portion of the lower lid, palpebral conjunctiva, retrotarsal fold, bulbar conjunctiva, episcleral tissue, scleral tissue, and ocular

muscles. The intraocular pigmentation was intense at the sites where pigment is normally found. Besides this, there was pigmentation of the lamina cribrosa, Schlemm's canal, pectinate ligament, blood vessels of the iris and cilioretinal artery.

CONCLUSIONS:

1. Melanosarcoma has developed in 29 per cent of the recorded cases of melanosis bulbi. Therefore, the condition of melanosis bulbi is potentially a dangerous one, particularly in the latter years of life.

2. Pigmentation of the lamina cribrosa no doubt explains the nature and site of areas of pigment and discoloration seen occasionally in the disc.

3. Heterochromia is not to be confused with melanosis bulbi.

4. Congenital pigment streaks on the posterior surface of the cornea are due to an aberration in development and are not manifestations of melanosis bulbi.

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POSTERIOR CHAMBER CYSTS OF THE IRIS.

J. H. ROTH, M. D., and C. W. GEIGER, M. D.

KANKAKEE, ILLINOIS

Current ideas with regard to these lesions are brought together from recent literature. Two cases are reported in one of which the eye was enucleated and studied microscopically. Read before the Chicago Ophthalmological Society, February 16, 1925.

Text books on ophthalmology are as a rule woefully silent concerning cystic tumors of the iris and the ciliary body, or else dismiss the subject with a few words. Norris and Oliver, in the "System of the Diseases of the Eye," assert that cysts of the iris and ciliary body are rare, and that three-fourths of the cystic tumors in this locality are the result of penetrating injuries near the corneoscleral junction, as evidenced by the history and the finding of the cicatrix.

Brailey and Stephenson divide cystic tumors of the iris and ciliary body into two varieties—serous and epidermoid. They describe serous cysts in the anterior chamber as small transparent vesicles, usually single and unilateral. They may become lobulated. A few attenuated iris fibers may be found in the cyst wall, and occasionally greyish brown pigment. Serous cysts are usually described as tumors with a wall or capsule containing fluid, while epidermoid cysts are epithelial cysts and usually contain a mass of epithelial cells.

Concerning the origin of the cystic tumors of the iris, Rothmund was perhaps the first to suggest that particles of the epithelium, corneal or conjunctival, could be carried into the iris tissue by the penetrating instrument, and by proliferation become the origin of the cystic formation. De Wecker assumes that the traumatic cysts may be the result of posterior adhesions, by which a limited portion of the posterior chamber becomes isolated, the gradual secretion of fluid resulting in the formation of the cyst. Schmidt-Rimpler suggested that the nontraumatic cysts may result from the closure of the crypts of the iris, which fill up with an accumulation of fluid, as-

suming the nature of a retention cyst. Cilia introduced into the eye at the time of injury are often the offending factor in these conditions, which seems to hold in one of the cases we wish to report. However, McGillivray reported a case in which an eyelash minus its root sheath remained in contact with the iris for eighteen months without any evidence of cystic formation. Wordsworth reported a number of globular cysts of the iris following a needling of a lamellar cataract. Stevenson reported an unusual mobile cyst of the posterior chamber, with pigmentation on the overlying iris. As long as the patient continued in the upright position, the cyst remained in the posterior chamber, but on bending her head forward the mass flowed thru the pupil into the anterior chamber. On assuming the erect position again, the tumor gradually settled into the posterior chamber.

Williams, Collins, Fuchs, Eales and Sinclair reported cases of darkly pigmented posterior chamber cysts. Greeff recorded a cyst of the iris five years after a successful cataract extraction. Fuchs suggests the aspiration of the tumor as a material aid in the diagnosis of such cysts from sarcoma.

Von Graefe reported a case of panophthalmitis following the removal of a simple cyst, while Tyrrell, Hulke and others have reported iritis, iridocyclitis and sympathetic ophthalmia in cases of cysts of the iris.

While cysts of the iris and ciliary body are regarded as rare conditions, many clinical reports are available in literature. On account of their interesting features and the means employed to eradicate them, we wish to take the liberty here of abstracting some of these case records.

Brownlie: March 15, 1922. Girl, aged 10. Ten months previously, L. E. had been operated for squint, with advancement of the external rectus and tenotomy of the internal rectus. Following the operation the eye had recurring attacks of watering and irritation. Two months before observation by Dr. Brownlie, the father had noticed a black spot behind the "edge of the sight" as he expressed it, at the site of the present tumor. This gradually increased in size until the author was consulted. Vision at the time of first observation 6/60, no improvement with refraction. No tension. On March 31st, an iridectomy with removal of the tumor mass was accomplished. After two months the tumor mass returned. On Sept. 29, the cyst was evacuated and the mass of the cyst removed thru a scleral trephine. On Jan. 19, 1923 the tumor had again returned necessitating removal of the eye. The diagnosis was indefinite as the section showed scant spindle cells, the nature of which was difficult to diagnose, but the laboratory was evidently of the opinion that the tumor was a simple cyst. The author believed that the tumor was an implantation cyst due to too deep penetration of the tunics of the eyeball during the advancement operation, or that some of the conjunctival cells were dragged in with the sutures and the eye of the needle.

Zimmermann: Patient was first seen in 1893 with a darkly pigmented mass in both pupils. This patient was also seen by Dr. Edward Jackson of Denver, who mentions the case in a paper in 1920. Both Drs. Jackson and Zimmermann believed that they were dealing with a melanosarcoma. Dr. George C. Harlan was consulted, and he thought the masses cysts, rather than sarcoma. The patient was under the observation of Dr. Zimmermann for four years, when he reported the tumors as cysts of the iris. Dr. Jackson, in his discussion of the case, points out that had the condition affected but one eye enucleation would have been urged, altho the vision was good.

Stephenson: A case of a tumor mass arising behind the iris and invading the pupillary area. He made a diagnosis of melanosarcoma, but the enucleated eye showed one large cyst and several smaller cysts formed by the separation of the layers of the iris.

Jackson: A boy, aged 13, with vision reduced to moving objects. The dilated pupil showed posterior synechiae and hazy vitreous. At the extreme limit of the fundus could be seen a greyish white swelling extending to the ciliary body, which could easily have been

mistaken for a sarcoma of the choroid or ciliary body. A diagnosis was finally made of probable uveitis.

Harrington: 1920. A congenital tumor at the corneoscleral junction. A diagnosis of dermoid cyst was made and attempts made to remove the mass, under which was revealed a coloboma of the sclera and a hernia of the choroid.

Goldenberg: In 1924, he reported two cases of cysts of the iris and successful removal of the same. In the first case, patient, age 19, gave a history of having had a penetrating injury of the right cornea eight years before. V. R=20/65 L.=20/20. The cyst consisted of a small bluish mass in the anterior chamber. Aspiration confirmed the diagnosis. An unsuccessful attempt was made to destroy the wall of the cyst. Later the cyst and the underlying iris were removed with apparently good results.

The second patient, age 47, had an injury to the right eye when very young. Shortly before observation by Dr. Goldenberg, the eye became irritable and red with lacrimation and photophobia. A bilobular cyst of the iris was discovered, but Dr. Goldenberg did not state whether the cyst occupied the anterior or posterior chamber. As in the previous case, unsuccessful attempts were made to destroy the cyst wall and later the mass was removed by iridectomy. Recovery was reported.

Our Cases: Frank H., age 44, seen March 17, 1924. The patient gave a history of perforating injury—a piece of steel, which was removed with a magnet 20 years previously. For past six months he has noticed that vision has failed and the eye has become red and irritable. About a month before observation, he noticed that the "sight of the eye" was not the same shape as its fellow, and a short time later discovered a growth encroaching on the "black spot of the eye." He was examined and treated by his family physician without satisfaction. When seen by Drs. Woodruff and Roth, his vision was 20/200 in the right eye, left 20/15. Refraction did not improve vision. The right eye showed iris discolored and distorted causing pupil to assume an oval shape toward the old perforating injury. On oblique illumination the iris was seen bulging forward and in contact with the under surface of the cornea. The distorted portion of the iris showed areas of suspicious yellowish brown pigment on a blue background. An irregular brownish tumor mass was seen invading the pupillary area. The lens showed effects of pressure. Dr. Woodruff suggested an examination by means of the slitlamp, and the patient was sent to Dr. Von der Heydt, who diagnosed the condition cyst of the iris and reported that a cilium could be seen in the cyst wall. We did not see the patient again.

Miss Anna S. Age 20. She was first seen by Dr. Geiger in 1911. Two days previously she had injured her right eye with a lead pencil. According to the records in our office, she had a perforating injury at the corneoscleral junction at five o'clock, with a small prolapse of the iris. There was evidently no excision of the prolapsed iris, as there was no iridodialysis or coloboma, and the pupil until the last observation was always round. An uneventful recovery occurred at that time. She was later refracted under atropin and given the following correction.

R. 15/200, plus 2.00 axis 45. = 15/30.
L. 15/40, plus .75 sphere = 15/15.

She was not a patient to complain much, or else she feared that if she made any statement about the eye being painful it would result in the eye being removed. However, her sister said that whenever she read she covered the right eye, and often after school the right eye would appear inflamed. But often we find the same condition where a patient has one eye that is very much more astigmatic than the other. She had many refractions, both manifest and with a cycloplegic, but no change was found. The last refraction was October 7, 1920, four years previous to the last observation. At that time the eye was quiet and gave no evidence of any tumor mass. The anterior chamber was of normal depth, and the pupil equal to

the other in size and excursion. On September 20, 1924, she presented herself for refraction. The eye had become irritated and red two months previously, but she had attributed it to the fact that she had been changed to more exacting work in the factory at which she was employed. The irritation gradually became worse and the pain more constant. At the time of observation her refraction was as follows:

R. 15/60, plus 3.50 axis 45° = 15/40.
L. 15/20, minus 0.25 sphere = 15/20-3.

No tension. The pupil was irregular and oval in the direction of the old injury. Reaction to light slow and limited. Oblique illumination showed the iris at 5 o'clock bulging up and in contact with the under surface of the cornea. In this locality there was what appeared to be a brownish pigmented area on a blue background. The anterior chamber was less shallow elsewhere. The lens reflex was altered as if the lens was being subjected to pressure. A small irregular tumor mass could be seen at the pupillary margin. Under homatropin the pupil dilated readily tho irregularly, revealing a brownish yellow mass between the lens and the iris. On account of the photophobia, lacrimation and loss of vision in the left eye, sympathetic ophthalmia was one of the conditions first considered, and this condition was uppermost in our minds at all times. Dr. Roth was of the opinion that we were dealing with a sarcoma of the iris. Dr. Geiger was perhaps influenced by his previous diagnosis and he concurred with him. The case was then seen by Dr. Woodruff, who thought that enucleation was advisable. The laboratory report by Dr. J. J. Moore is as follows:

Emergency Hospital, Kankakee, Ill. Dr. J. Roth, No. 74761, Sorenson, February 16, 1925. Specimen of Eye Tissue. In one section there is apparently one cyst, in the other two, which shows that the process is a multilocular cyst which lies between the posterior surface of the iris and the ciliary body. The latter is pushed backward and the lens is displaced. The iris is pushed forward in contact with under surface of the cornea. The canal of Schlemm in this region is practically obliterated. The inner lining of the cyst consists of several layers of flattened squamous epithelium. In some places this layer appears to be in contact with the iris; in others there is a fibrous tissue stroma intervening. The pigment layer of the iris covers the entire cyst, which causes a bulging of the former. There is no evidence of melanosarcoma in this section.

The sections were examined by Drs. Ludvig Hektoen and J. J. Moore.

We would like to have had the eye examined by an authority with the slit-lamp, but on account of the economic status of the patient and the gravity of her symptoms, we hesitated to advise it. We were unable to determine the origin of the cyst, even after the method of Trantas, which consists in pressure over the ciliary body for ophthalmoscopic examination. Transillumination did not help us. The fundus in this region was distorted, presumably on account of the slight pressure dislocation of the lens and her own astigmatic error. An attempt should have been made to aspirate the tumor mass, but the general appearance of the tumor clinically was so suggestive of melanosarcoma and the brown pigmentation on an otherwise blue iris so like that of the tumor mass, that the possibilities of a cyst were not so seriously considered. Upon studying the cut section, we still are of the opinion that the tumor would have been exceptionally difficult to remove successfully by iridectomy. Just the same, we now believe that we made a mistake in not making some attempt at removal of the tumor mass rather than enucleation. However, we can find consolation in the fact that Brownlie was unsuccessful in removing posterior chamber cysts, and that Stephenson made the same clinical error that we did. Oliver and Norris state that an iris that has been subjected to prolonged irritation becomes atrophic, and that the pigment shows thru the thinned stroma simulating the proliferation of pigment. This may explain our mistaking the pigmented spot on the iris for the extension of a neoplasm.

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HYPEROPHORIA AS A FACTOR IN EYESTRAIN.

F. E. WOODRUFF, M.D.

ST. LOUIS, MO.

The influence of hyperphoria when the eyes are turned somewhat downward, is here chiefly considered. Statistics are given of the frequency with which prisms base up or down are prescribed; as shown by the files of three opticians and in the author's own practice. Read before the St. Louis Ophthalmic Society, March, 1925, see p. 897.

In the consideration of this subject of hyperphoria as a factor in refraction I shall not consider any other muscle condition or any of the other phorias. I shall, however, try to separate the cases where the correction for hyperphoria has been ordered for use for distance only, for reading only and for combined use.

That condition in which the muscular imbalance is the result of a general physical condition will not be considered at this time. I am excluding under the above classification those cases where the general nutrition and the muscular activity is below par. I am excluding also those cases of paralysis of an elevator, or of a depressor.

Those cases in which there is trouble with the elevators are comparatively rarely found. A diminished activity in the elevators or an increased activity in the depressors would manifest itself by an imbalance in the upper part of the field of vision. This upper part of the field plays a relatively small part in our daily vocational activities.

We are here concerned with trouble in the lower part of the field for both distance and close work. This difficulty may be anatomic or physiologic.

The choice of methods of examination is varied. Whatever method is adopted it is necessary to measure the deviation in the horizontal plane, also in the lower field for both distance and near vision in the walking or reading position. This I consider of prime importance, for vision directly in front on a level with the eyes does not bring into action either the elevator or depressor muscles. All measurements of a muscle imbalance presuppose a correction of the ametropia, or of the presbyopia. It is also presupposed that paralyses are excluded, and that the general physical condition has been brought to as near normal as possible.

The changes in the degree or amount of hyperphoria, after due attention has been paid to the refraction and to the general physical health, are much less than the changes in the exophorias or in the esophorias. When the individual has once become accustomed to the wearing of a correction for a vertical phoria he finds it difficult to lay this correction aside, because of the greater comfort experienced when the vertical imbalance is corrected.

The symptoms whether objective or subjective will not be discussed. The diagnosis can be readily made by using one or more of the various methods. The treatment naturally consists in removing the cause when possible, giving due heed to anatomic and physiologic factors, giving attention to constitutional changes and to errors in the

refraction. Operative treatment is not to be considered in this paper.

This condition of hyperphoria which may be due to excessive activity of the elevators or relaxation of the depressors is not, of course, to be confused with the tropias where there is a paralysis of one of the depressors.

After measuring the degree of hyperphoria directly in front and on a level with the eye, one finds at times a marked increase when the measurement is taken with the eye rotated down as in walking or reading. When the patient is standing and the test light or object is on the floor the separation of the images is so great that discomfort arises, which is not noticeable in the horizontal plane or even slightly below the horizontal. This vision in the lower part of the field calls into more vigorous action the depressors; which may be weakened or have a malposition, or call upon a normal muscle to overcome an abnormally strong elevator, or even an abnormally placed elevator or globes that are in asymmetric orbits. A similar condition maintains when measuring the hyperphoria for near work, and it is not sufficient to measure the imbalance on the level with the patient's eye but it should be measured also in the normal reading or working position, i. e. in the field of action of the depressors. These details should be carefully observed in order to have sufficient data on which to base the degree of the prism. After the correction of the refraction and of the general condition of the individual (in hyperphoria), the full prismatic correction may be ordered for near, or far, or for combined use.

FREQUENCY OF USE OF VERTICAL PRISMS.

In order that I might have some idea of the frequency with which hyperphoria was found and corrected by the ordering of correcting prisms I asked three of our leading opticians to select from their last thousand prescriptions those which called for prisms base up or down.

One optician reported seven prescriptions out of one thousand. Another reported nine prescriptions out of one thousand. The third reported twenty-four prescriptions out of one thousand.

Out of one thousand prescriptions from my own files taken alphabetically there are nineteen cases of vertical muscle imbalance.

PRISMS ORDERED IN 3,000 PRESCRIPTIONS.

Distance and reading Not presbyopes		Reading		Distance and reading Presbyopes	
Right	Left	Right	Left	Right	Left
4 up	.....	.....	.....	1 down	1 up
½ up	.....	.....	.....	2 down	2 up
1 up	1 down	.....	.....	.....	.....
.....	2 down	.....	.....	.....	.....
.....	2 up	.....	.....	.....	.....
2 down	2 up	1½ down	.....	2 up	2 down
2 down	2 up	.....	.....	1 up	1 down
1 down	½ up	.....	.....	1 up	1 down
			.....	.....	1 down
			.....	.....	1 down
3 down	.....	1 up	2 down	1 up	1 down
1 down	.....	1 up	2 down	½ up	½ down
5 down	.....	.....	3 down	2 up	2 down
½ down	.....	.....	.....	.....	2½ down
.....	2 up	5 down	.....	.....	2 down
2 up	2 down	.....	.....	.....	½ down
2 up	2 down	.....	.....	½ down	.....
.....	2 down	.....	.....	½ down	.....
.....	½ down	.....	.....	3 down	2 up
.....	1½ down	.....	.....	.....	4 up

VERTICAL PRISMS FOR 1,000 OF AUTHOR'S CASES.

Distance and reading Not presbyopes		Reading Presbyopes		Distance		Distance and reading Presbyopes	
Right	Left	Right	Left	Right	Left	Right	Left
3 down	3 up	2 up	2 down	.....	5 down	2 up	½ down
2 down	1 up	.....	3 down	.....	.....	2 up	2 down
1 down	1 up	.....	2 down	.....	.....	2 up	1 down
1 down	.....	.....	.....	.....	.....	.....	2 down
5 up	5 down	.....	.....	.....	.....	8 down	8 up
2 up	2 down	.....	.....	.....	.....	2 down	2 up
1 up	2 down	.....	.....	.....	.....	.....	.....
.....	2 down	.....	.....	.....	.....	.....	.....
.....	3 down	.....	.....	.....	.....	.....	.....

For distance and reading in those not presbyopes, there are four cases of right hyperphoria and five of left hyperphoria. For reading among presbyopes there are three cases of left hyperphoria. For distance use only there is one case of left hyperphoria. For distance and reading in presbyopes there are four cases of left hyperphoria and two of right hyperphoria.

Thorington says under the heading of hyperphoria: "In the consideration of vertical diplopia, which is always a condition of crossed diplopia, never homonymous diplopia, the eye which is deviated upward is spoken of as the hyperphoric eye."

Since a homonymous diplopia is produced by trouble in the external recti or the superior or inferior obliques and hyperphoria is, according to Thorington, always a heteronymous diplopia and the levators and the depressors are the muscles involved, we are forced to the conclusion that hyperphoria is the result of impaired functions in the superior or inferior recti or in both a superior and an inferior rectus.

In order that there may be uniformity in classification I have put the entire prism over the right eye in these prescriptions and find that there are four cases requiring prisms only.

There are eight cases of hyperphoria among hyperopes.

There are three cases of hyperphoria in hyperopic astigmatism.

There are twenty-nine cases of hyperphoria in compound hyperopic astigmatism.

There are no cases in myopia.

There is one case of hyperphoria in myopic astigmatism.

There are three cases of hyperphoria in compound myopic astigmatism.

There are eight cases of hyperphoria in mixed astigmatism.

In placing all of the prism over the left eye the classification is about the same.

There are three cases of hyperphoria with prisms only.

There are ten cases of hyperphoria in hyperopia.

There are five cases of hyperphoria in hyperopic astigmatism.

There are thirty cases of hyperphoria in compound hyperopic astigmatism.

There are no cases of hyperphoria in myopia.

There is one case of hyperphoria in myopic astigmatism.

There are three cases of hyperphoria in compound myopic astigmatism.

There are four cases of hyperphoria in mixed astigmatism.

The number of cases of compound hyperopic astigmatism is largely in excess. In fact these cases outnumber all of the others combined. This fact I am unable to explain.

I am giving the prescriptions for reference for those who wish to know the exact combination in any particular case.

Right	−	0.62	Ds.	=	−	0.37	Dcyl.	ax.	0	=	4	prism	base	up
Right					−	0.50	Dcyl.	ax.	180	=	½	prism	base	up
Left	+	0.25	Ds.								1	prism	base	up
Right											1	prism	base	down
Left														
Right	−	0.25	Ds.	=	+	4.25	Dcyl.	ax.	90					
Left	+	2.00	Ds.	=	+	3.50	Dcyl.	ax.	115	=	2	prism	base	down
Left	+	8.00	Ds.							=	2	prism	base	up
Right	−	0.25	Ds.	=	+	0.75	Dcyl.	ax.	180	=	1	prism	base	down
Left					+	0.50	Dcyl.	ax.	180	=	1	prism	base	up
Right	+	1.75	Ds.	added										
Left	+	1.75	Ds.	added										
Right	−	1.00	Ds.	=	+	2.75	Dcyl.	ax.	130	=	2	prism	base	down
Left	−	4.50	Ds.	=	−	1.00	Dcyl.	ax.	135	=	2	prism	base	up
Right	+	1.00	Ds.	added										
Left	+	1.00	Ds.	added										
Right	+	0.75	Ds.							=	2	prism	base	down
Left	+	0.75	Ds.							=	2	prism	base	up
Right					+	5.00	Dcyl.	ax.	90	=	2	prism	base	down
Left	−	0.50	Ds.	=	+	5.00	Dcyl.	ax.	90	=	2	prism	base	up
Right	−	0.25	Ds.	=	+	1.00	Dcyl.	ax.	135	=	1	prism	base	down
Left	−	0.25	Ds.	=	+	1.75	Dcyl.	ax.	45	=	½	prism	base	up
Right	+	1.25	Ds.							=	1½	prism	base	down
Left	+	0.75	Ds.	=	+	0.50	Dcyl.	ax.	90			prism	base	down
Right											2			
Left					+	0.25	Dcyl.	ax.	90	=	2	prism	base	up
Right	+	1.50	Ds.	added										
Left	+	1.50	Ds.	added										
Right	+	1.50	Ds.	=	+	0.25	Dcyl.	ax.	90	=	1	prism	base	up
Left	+	2.00	Ds.	=	+	0.25	Dcyl.	ax.	90	=	1	prism	base	down

Right	+	2.00	Ds.	added									
Left	+	2.00	Ds.	added									
Right	+	5.00	Ds.	=	+	0.50	Dcyl.	ax.	165	=	1	prism base	up
Left	+	5.00	Ds.	=	+	0.75	Dcyl.	ax.	15	=	1	prism base	down
Right	+	2.25	Ds.	added									
Left	+	2.25	Ds.	added									
Right	+	0.50	Ds.	=	+	0.37	Dcyl.	ax.	180				
Left	+	0.50	Ds.	=	+	0.37	Dcyl.	ax.	180	=	1	prism base	down
Right	+	2.00	Ds.	added									
Left	+	2.00	Ds.	added									
Right	+	1.25	Ds.	=	+	0.75	Dcyl.	ax.	170				
Left	+	1.00	Ds.	=	+	1.25	Dcyl.	ax.	170	=	1	prism base	down
Right	+	2.50	Ds.	added									
Left	+	2.50	Ds.	added									
Right	+	0.50	Ds.	=	+	0.62	Dcyl.	ax.	60	=	3	prism base	down
Left	+	1.25	Ds.	=	+	0.50	Dcyl.	ax.	180				
Right	+	0.50	Ds.	=	+	0.75	Dcyl.	ax.	75	=	1	prism base	down
Left	+	1.00	Ds.	=	+	0.25	Dcyl.	ax.	105				
Right	+	3.00	Ds.	=	+	2.50	Dcyl.	ax.	60	=	5	prism base	down
Left	+	2.25	Ds.	=	+	2.25	Dcyl.	ax.	70				
Right	+	1.25	Ds.							=	½	prism base	down
Left	+	1.12	Ds.										
Right	−	1.25	Ds.	=	+	1.75	Dcyl.	ax.	75	=	3	prism base	out
Left					−	1.25	Dcyl.	ax.	60	=	2	prism base	up
Right	+	1.87	Ds.	=	−	0.62	Dcyl.	ax.	105	=	2	prism base	up
Left	+	2.25	Ds.	=	−	0.37	Dcyl.	ax.	15	=	2	prism base	down
Right	+	0.87	Ds.	=	−	1.87	Dcyl.	ax.	100	=	2	prism base	up
Left	+	0.62	Ds.	=	−	1.37	Dcyl.	ax.	70	=	2	prism base	down
Right	−	3.50	Ds.	=	−	2.50	Dcyl.	ax.	180				
Left	−	3.00	Ds.	=	−	0.50	Dcyl.	ax.	15	=	2	prism base	down
Right	−	1.75	Ds.	=	−	2.25	Dcyl.	ax.	90				
Left	−	0.75	Ds.	=	−	3.25	Dcyl.	ax.	80	=	½	prism base	down
Right	+	1.25	Ds.	=	+	4.00	Dcyl.	ax.	87½				
Left	+	0.75	Ds.	=	+	4.25	Dcyl.	ax.	90	=	1½	prism base	down
Right	+	1.12	Ds.	=	+	0.37	Dcyl.	ax.	115	=	1	prism base	up
Left	+	0.87	Ds.	=	+	0.25	Dcyl.	ax.	65	=	2	prism base	down
Right	+	1.75	Ds.	=	−	1.00	Dcyl.	ax.	180	=	1	prism base	up
Left	+	1.75	Ds.	=	−	1.00	Dcyl.	ax.	180	=	2	prism base	down
Right	+	2.50	Ds.	=	+	3.50	Dcyl.	ax.	115				
Left	+	3.00	Ds.	=	+	4.00	Dcyl.	ax.	55	=	3	prism base	down
Right	+	3.00	Ds.	=	+	2.50	Dcyl.	ax.	60	=	5	prism base	down
Left	+	2.25	Ds.	=	+	2.25	Dcyl.	ax.	70				
Right	+	2.50	Ds.	=	−	0.37	Dcyl.	ax.	180	=	1	prism base	up
Left	+	2.25	Ds.	=	−	0.37	Dcyl.	ax.	180	=	1	prism base	down
Right	+	2.50	Ds.	added									
Left	+	2.50	Ds.	added									
Right	+	2.75	Ds.	=	−	1.25	Dcyl.	ax.	100	=	¼	prism base	up
Left	+	1.75	Ds.	=	−	0.25	Dcyl.	ax.	80	=	½	prism base	down
Right	+	1.00	Ds.	added									
Left	+	1.00	Ds.	added									
Right	+	1.25	Ds.	=	−	0.62	Dcyl.	ax.	180	=	2	prism base	up
Left	+	1.50	Ds.	=	−	0.50	Dcyl.	ax.	165	=	2	prism base	down
Right	+	2.00	Ds.	added									
Left	+	2.00	Ds.	added									
Right	+	2.00	Ds.										
Left	+	2.00	Ds.							=	2½	prism base	down
Right	+	3.00	Ds.	added									
Left	+	3.00	Ds.	added									
Right	+	1.25	Ds.	=	−	1.00	Dcyl.	ax.	15				
Left	+	1.25	Ds.	=	−	0.12	Dcyl.	ax.	30	=	2	prism base	down
Right	+	2.25	Ds.	added									
Left	+	2.25	Ds.	added									
Right	+	2.12	Ds.	=	−	0.12	Dcyl.	ax.	180				
Left	+	2.12	Ds.	=	−	0.37	Dcyl.	ax.	165	=	½	prism base	down
Right	+	2.25	Ds.	=	−	1.25	Dcyl.	ax.	30	=	½	prism base	down
Left	+	2.50	Ds.	=	−	1.25	Dcyl.	ax.	180				
Right	+	2.50	Ds.	added									
Left	+	2.50	Ds.	added									
Right	+	0.62	Ds.	=	+	0.87	Dcyl.	ax.	90	=	½	prism base	down
Left	+	0.37	Ds.	=	+	0.87	Dcyl.	ax.	95				
Right	+	0.75	Ds.	added									
Left	+	0.75	Ds.	added									
Right	+	3.25	Ds.	=	+	0.50	Dcyl.	ax.	90	=	3	prism base	down
Left	+	3.50	Ds.	=	+	0.50	Dcyl.	ax.	105	=	2	prism base	up
Right	+	0.75	Ds.										
Left	+	0.75	Ds.							=	4	prism base	up
Right	+	1.00	Ds.	added									
Left	+	1.00	Ds.	added									
Aet 40	+	1.25	Ds.	=	−	0.87	Dcyl.	ax.	165	=	3	prism b.	down
Dist. & reading	+	1.25	Ds.	=	−	0.87	Dcyl.	ax.	15	=	3	prism b.	up
Aet 26					+	0.50	Dcyl.	ax.	120	=	2	prism b.	down
Dist. & reading					+	0.50	Dcyl.	ax.	90	=	1	prism b.	up
Aet 9											1	prism b.	down
Dist. & reading											1	prism b.	up
Aet 34	+	1.12	Ds.	=	−	0.75	Dcyl.	ax.	15	=	1	prism b.	down
Dist. & reading	+	1.12	Ds.	=	−	0.75	Dcyl.	ax.	165				
Aet 20	+	1.50	Ds.	=	−	1.00	Dcyl.	ax.	180	=	5	prism b.	up
Dist. & reading	+	1.50	Ds.							=	5	prism b.	down
Aet 14											2	prism b.	up
Dist. & reading											2	prism b.	down
Aet 36					+	0.50	Dcyl.	ax.	90	=	1	prism b.	up
Dist. & reading					+	0.50	Dcyl.	ax.	180	=	2	prism b.	down
Aet 33	−	3.50	Ds.	=	−	2.50	Dcyl.	ax.	180				
Dist. & reading	−	3.00	Ds.	=	−	0.50	Dcyl.	ax.	15	=	2	prism b.	down
Aet 20	+	1.25	Ds.	=	−	0.75	Dcyl.	ax.	90				
Dist. & reading	+	1.25	Ds.	=	−	0.75	Dcyl.	ax.	90	=	3	prism b.	down

Aet 55	+	3.75	Ds.							=	2	prism b. up
Reading	+	3.75	Ds.							=	2	prism b. down
Aet 48	+	3.00	Ds.									
Reading	+	3.00	Ds.							=	3	prism b. down
Aet 60	+	6.00	Ds.	=	−	1.00	Dcyl.	ax.	180			
Reading	+	6.00	Ds.	=	−	1.00	Dcyl.	ax.	180	=	2	prism b. down
(Dist. glass R. & L. + 3.00 Ds. = − 1.00 Dcyl. ax. 180)												
Aet 56	+	3.00	Ds.									
Distance	+	2.50	Ds.	=	−	0.50	Dcyl.	ax.	15	=	5	prism b. down
Aet 75												
Distance	+	2.00	Ds.							=	2	prism b. up
	+	2.00	Ds.							=	½	prism b. down
Reading	+	5.00	Ds.							=	2	prism b. up
	+	5.00	Ds.							=	½	prism b. down
Aet 43	+	0.37	Ds.	=	−	0.62	Dcyl.	ax.	180	=	2	prism b. up
Distance	+	0.37	Ds.	=	−	0.62	Dcyl.	ax.	180	=	2	prism b. down
Reading	+	1.37	Ds.	=	−	0.62	Dcyl.	ax.	180	=	2	prism b. up
	+	1.37	Ds.	=	−	0.62	Dcyl.	ax.	180	=	2	prism b. down
Aet 55	+	1.50	Ds.	=	−	0.50	Dcyl.	ax.	90	=	2	prism b. up
Distance	+	1.25	Ds.	=	−	0.50	Dcyl.	ax.	75	=	1	prism b. down
Reading	+	4.00	Ds.	=	−	0.50	Dcyl.	ax.	90	=	2	prism b. up
	+	3.75	Ds.	=	−	0.50	Dcyl.	ax.	75	=	1	prism b. down
Aet 45	+	3.00	Ds.	=	−	0.25	Dcyl.	ax.	165			
Distance	+	3.00	Ds.							=	2	prism b. down
Reading	+	4.25	Ds.	=	−	0.25	Dcyl.	ax.	165			
	+	4.25	Ds.							=	2	prism b. down
Aet 44	+	3.00	Ds.	=	−	1.00	Dcyl.	ax.	75	=	8	prism b. down
Distance	+	3.00	Ds.	=	−	1.00	Dcyl.	ax.	135	=	8	prism b. up
Reading	+	6.00	Ds.	=	−	1.00	Dcyl.	ax.	75	=	8	prism b. down
	+	6.00	Ds.	=	−	1.00	Dcyl.	ax.	135	=	8	prism b. up
(Separate glasses)												
Aet 70	+	0.50	Ds.	=	−	1.00	Dcyl.	ax.	180	=	2	prism b. down
Distance	+	0.50	Ds.	=	−	0.50	Dcyl.	ax.	180	=	2	prism b. up
Reading	+	3.50	Ds.	=	−	1.00	Dcyl.	ax.	180	=	2	prism b. down
	+	3.50	Ds.	=	−	0.50	Dcyl.	ax.	180	=	2	prism b. up

BILATERAL PAPILLITIS ASSOCIATED WITH ACCESSORY NASAL SINUS DISEASE AND NEPHRITIS.

C. W. TOOKER, M.D.

ST. LOUIS, MO.

The discrimination between papilledema and papillitis is discussed. A case is reported in which with cerebral, vascular and renal symptoms there occurred diplopia and loss of vision, with papillitis. The patient also had serious infection of the nasal sinuses. Read before the St. Louis Ophthalmic Society, March, 1925, see p. 898.

Altho Fuchs[1] includes both papilledema and papillitis under the classification "inflammations of the optic nerve; neuritis intraocularis," many ophthalmologists will agree with Holden[2] in differentiating between a pure edema, "papilledema," and true inflammation of the nerve, "papillitis." Cushing[3] evidently believed in this distinction when he wrote: "Inflammatory processes may affect the optic nerve in such a way as to produce reddening, injection and possibly such a degree of hyperemia and vascularity of the nervehead as to resemble the early hyperemic stage of choked disc, but it is unbelievable that an infection of the accessory nasal sinuses in the absence of increased intracranial tension should produce an actual choked disc." Definite types of papilledema with mushroom swelling of the nervehead, venous engorgement, but without hemorrhage or inflammatory exudate in the retina, and also characteristic examples of papillitis, with no considerable swelling of the disc but with venous engorgement, inflammatory exudate and numerous hemorrhages in the retina, can usually be readily diagnosticated. There are, however, as Fuchs states, many transitional forms, and the determination of their etiology may be difficult. The following case history illustrates some of these difficulties.

Miss M. B., white, aged 24 came to my clinic at Mullanphy Hospital June 5th, 1924, because of headaches, poor vision and diplopia, all developing within a month. Family history, mother, father, three sisters and one brother, alive and in good health. There has been no malignancy, tuberculosis or insanity in the family. Previous health good, but for several years she has had some "nasal catarrh" and during the last six months she has lost

about ten pounds of her usual weight. Her teeth received attention one year ago. Six years ago she was fitted to glasses for near work:
R. + 2.00 S. ⌒ + .50 cyl. ax. 45°.
L. + 2.00 S. ⌒ + 1.00 cyl. ax. 155°.
Habits; normal with the exception of cigarette smoking in excess and occasional indulgence in alcoholics.

About one month before consulting me, she began to suffer with severe headache, day and night, "all over her head." There were periods of remission when she obtained some rest, but this distress continued despite medical attention for two weeks. Twice during this period she had "fainting spells," lasting about 20 minutes. During these attacks she became somewhat cyanotic but there were no convulsions. She was frequently dizzy, nauseated, and often vomited, but not in a projectile manner. About ten days prior to her visit to the clinic she began to see double and her headache disappeared. Her vision, she thinks, has been gradually getting worse. She is now feeling well, complaining only of "double vision."

Examination: pupillary reactions normal. Vision right eye 20/150, J. No. 14; left eye 6/200. Left hyperphoria, 2°; esotropia, 28°; alternating convergent strabismus, fixation with R., usually. There is homonymous diplopia in all directions of the gaze, no tilting and no difference in elevation of either image. The form fields are normal and the ocular media are clear.

The eyeground changes differ only in degree. Each disc is elevated approximately six diopters above the level of the fundus at the macula, and its outlines cannot be determined excepting for the downward bending of the vessels at its supposed periphery. After leaving the region of the disc the vessels disappear and reappear in the edematous retina. The surface of the disc is marked by some yellowish white splotches of exudate. It is difficult to determine accurately the course of the vessels on the disc and the lamina cribrosa cannot be seen. The retina is edematous, as far forward as can be seen. In the macular region are several whitish streaks, resembling somewhat the exudates in albuminuric retinitis. Some few small hemorrhages can be seen, scattered thruout the fundus. The retinal veins are moderately dilated.

She was sent to Mullanphy Hospital for further study and treatment by the staff and remained there three weeks. Neurologic examination: left Babinski sign present, left knee jerk rather more active than right. Spinal fluid, 6 c.c. withdrawn, not under pressure. Wassermann test of it negative. globulin and cell count normal, colloidal gold curve normal. Roentgenologic examination: "Left frontal portion of skull shows a hazy rarefied appearance, slightly suggestive of intracranial pressure; and posterior to this region there appears an area of increased density, which may indicate presence of tumor; not very distinct." "Left anterior sinus seems cloudy." Surgical examination: negative. A cranial decompression was considered because of the elevation of her discs and failing vision, but was deferred until other examinations had been made. Rhinologic examination: evidence of infection of the left posterior ethmoid cells. The general physical examination was negative with these exceptions: blood pressure 210 systolic, 140 diastolic, urine contained albumin and casts. Her temperature varied from 99 to 100.5, her pulse rate from 90 to 100 and her respiration was usually about 20.

Three days after entering the hospital the anterior two thirds of the right middle turbinate was removed, the left middle turbinate having been found absent. The ethmoid cells on both sides were exenterated and evidence of infection in the left posterior ethmoid cells was found. No free pus was present. The sphenoids were entered thru their natural openings. During the afternoon and evening of the nasal operation day, the patient lost about 500 c.c. of blood from the nose. Blood pressure three days later 170/136; the swelling of the discs had diminished. The urine contained albumin and many hyalin casts. Five days later the swelling of the discs had decreased to about two diopters. Ten days after the nasal operation there was no diplopia and the ocular move-

ments were almost normal. V. O. D. = 20/80, V. O. S. = 20/200. Three weeks after entering the hospital she consulted me at my office bringing the following medical report.

"Concerning Miss M. B., the general physical examination, with the exception of a blood pressure of 210/140, was essentially negative; I am excepting, of course, the results of the special examinations. The white count on admission was 13,600 with no noteworthy changes in the differential count. The blood and spinal fluid Wassermanns were negative; the colloidal gold curve was normal. The urine on entrance was acid, strong positive albumin, no sugar, 1,025, many hyalin and granular casts. The N. P. N. was 33.9 mg. per 100 cc. of blood, and the P. S. P. was 40%. It was our impression at this time, on account of the good P. S. P. and not abnormal N. P. N., that this patient did not have an essential kidney lesion but was suffering from an irritative or toxic kidney lesion, a so-called nephrosis.

After a period of eight days, on a diet of 25 grams of protein in twenty-four hours, we found that the voided specimen of urine contained two grams of albumin per liter, with an occasional hyalin cast and white blood cell; during this period also a catheterized specimen of urine was examined which contained only one gram of albumin per liter of urine with occasional hyalin cast and white cell. At the end of this eight day period of observation, the N. P. N. was 30.6 mg. per 100 cc. of blood and her P. S. P. was 50%. She was then placed on an unlimited protein diet and at the end of nine days her N. P. N. was 27 mg. per 100 cc. of blood and her P. S. P. was 45%. During this period, the uncatheterized specimen of urine continued to show two grams of albumin per liter with a gradual disappearance of the hyalin and granular casts. We were unable to obtain a catheterized specimen just preceding her discharge from the hospital. The white blood count at the time of her discharge was 9000. During the period of observation, there was a gradual fall of blood pressure and our reading at the time of her discharge was 146-96.

Until further observation proves to the contrary, it can be assumed that relief of the suppurative nasal processes was the cause of her gradual improvement. If this assumption is correct, then the kidney condition can be considered a nephrosis and not an essential lesion of the kidney itself. From a clinical standpoint, the results from the relief of the focal infection were most striking."

Her refraction measured: R + 3.00 D. S. = 20/80. L + 2.50 D. S. ⌒ + 1.50 ax. 135° = 20/80. Esophoria four degrees for distance, none for near. Her discs were elevated about one diopter and her retinal veins were moderately dilated. Between the discs and the maculae there were whitish streaks and small dirty yellowish spots of exudate. At the maculae were many fine white dots. Blood pressure 195/115. The urine contained no albumin. A skiagram of her teeth showed three diseased roots which were extracted. Ten days later her urine showed only a trace of albumin and she continued to feel well. One month later her vision with correction equalled R. 20/50, L. 20/80. Her blood pressure measured 215/115 and her urine contained some albumin and hyalin casts. Her discs were not measurably elevated and the outlines were fairly distinct. The exudates had not been absorbed.

Jan. 29th, 1925, V. R. with correction 20/40, J. 2. correction; L. 20/80, J. 6. Exoph. dist., 6. Blood pressure 235/140, Urine, acid, specific gravity 1014, trace of acetone, some albumin and a few hyalin casts. She states that she is feeling perfectly well and that she has had no headache, diplopia, or vertigo since her last visit six months ago. She has been helping at house work, going about as usual and eating what she wants with the exception of meats.

Fundus Examination. Right, disc margins fairly distinct, arteries and veins small, nervehead pale. Scattered over the eyegrounds are small white spots, not stellate in grouping and not surrounded by pigment. Left, appearance similar to right but disc margins not so well defined and nerve-

head quite pale. At the macula are a few small reddish brown spots.

Summary. In an apparently healthy girl of twenty-four years of age there suddenly developed ocular and cerebral symptoms associated with arterial and renal signs indicating a severe toxemia. After a few weeks of toxic symptoms, diplopia occurred and from that time to date she has felt well, complaining only of some loss of vision. At repeated examinations by several ophthalmologists there was present at first a definite bilateral papillitis with much elevation of the discs and a strabismus. The only treatment given her was an operation on her nasal accessory sinuses which was followed by a severe hemorrhage, and rest in bed. The papillitis subsided and the ocular muscle balance became almost normal but the macular degeneration and optic atrophy following the papillitis have impaired her vision. Her high blood pressure has not been permanently lowered and the evidences of renal disease persist.

Comment. Character of the nerve-head changes. While some difference of opinion existed as to the exact amount of disc elevation it was certainly much greater than that of a simple papillitis, in fact it resembled the swelling of a choked disc, yet the inflammatory features added to the disc swelling seemed to warrant the diagnosis of papillitis. The appearance of the discs eight months after the first examination indicates that atrophy resulted from the constriction of the nerve fibers by newly formed connective tissue. The eyegrounds nowhere contain stellate albuminuric figures, or exudates with pigment deposits, which one would expect to find after a papillitis of toxic or renal origin.

No isolated muscle paralysis could be determined. Considering the alternate character of the strabismus and the fields of diplopia the idea of a muscle imbalance of central origin seems reasonable.

The only discovered abnormalities in addition to the ocular findings were a nasal sinus infection, an albuminuria with casts, and a high blood pressure. It is of course possible that another undiscovered focal infection was present, or that at a later date more definite signs of a cerebral tumor or abscess will be manifest. The internists agreed in regarding the renal and arterial conditions as toxic in nature and not organic. The persistence of arterial hypertension and renal irritation after the thoro removal of the only focus of infection found would make one doubt this opinion. It has, of course, long been known that an essential kidney lesion with arterial hypertension may produce a papillitis. If, however, the renal lesion be organic and the present hypertension and albuminuria an expression of its continuation, it would not be quite reasonable to consider the double papillitis, which has disappeared, as of renal origin. The nasal accessory sinus infection may have caused both the papillitis and the toxic nephrosis which later became organic.

There remains to be considered the relationship of the nasal sinus infection to the papillitis. Varying opinions are held by equally competent observers as to the production of a choked disc or of a papillitis of high degree by an infection in the nasal accessory sinuses. Cushing[3] states that "when a retrobulbar neuritis is said to be accompanied by two or three diopters of swelling we are certainly dealing with something which a hyperplasia of the mucous membrane lining the accessory nasal sinuses is not capable of producing." Sluder[4] has reported several cases of bilateral choked disc accompanying accessory nasal sinus infection in the practice of several competent ophthalmologists. In one case the swelling measured six diopters in one eye and eight diopters in the other. Negative neurologic examinations were made in these cases and the condition —a hyperplastic sphenoiditis with often acute processes added—were relieved by postethmoid-sphenoid operations. He believes that "the lesion secondary to postethmoid-sphenoid lesions, is in all probability an optic neuritis, and that by the ophthalmoscope it may be undistinguishable from that produced by intracranial lesions."

In the case history above recorded

the improvement obtained may be attributed to the exenteration of the infected ethmoids and sphenoids and the subsequent depletion by hemorrhage. Observations over a longer period of time will be of course necessary to determine the cause of the continued albuminuria and hypertension.

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EXOPHTHALMOS A COMPLICATION OF NASAL SINUSITIS.

C. F. YERGER, M. D.

CHICAGO, ILL.

Statistics are given as to the frequency of these conditions. The anatomy of the parts concerned and the probable path of infection are discussed. Symptoms and differential diagnosis, prognosis and treatment are all considered. Read before the Chicago Ophthalmological Society, February 16, 1925.

Exophthalmos due to nasal sinus disease is invariably unilateral. The most frequent cause of unilateral exophthalmos is suppurative sinusitis. The most common orbital complication of sinusitis is orbital cellulitis and abcess, which is usually the result of frontal or ethmoid sinusitis, involving the former in adults and the latter in children. It is, also, noteworthy that while suppurative nasal sinusitis is relatively common, yet the incidence of orbital phlegmon is infrequent and exophthalmos is rare.

STATISTICS. To determine the incidence of suppurative sinusitis, orbital phlegmon and exophthalmos, the available reports of the Illinois Eye and Ear Infirmary for the last 10 years were examined. There were recorded 357 cases of empyema of the accessory nasal sinuses which were involved as follows: frontal, 45%; maxillary, 28%; ethmoid, 24%; and sphenoid, 3%. Of 150 cases of orbital phlegmon, 146 were recorded as orbital cellulitis and 4 as orbital abscess. Empyema of the nasal sinuses was about two and one-half times as frequent as orbital phlegmon. There were 37 cases of exophthalmos recorded, but they were not classified as to etiology. Orbital phlegmons were 4 times, and empyemata of the nasal sinuses were 10 times as frequent as exophthalmos.

Exophthalmos secondary to nasal sinus disease may be caused either by a pathologic increase in the volume of the orbital contents, the size of the orbit being normal, as in orbital phlegmon; or, by a pathologic diminution in the size of the orbit, the volume of the orbital contents being normal, as the encroachment on the orbital cavity by a mucocele or pyocele of the frontal or ethmoid sinuses.

The following is a summary of 7 cases of exophthalmos secondary to nasal sinus disease, (6 of which were observed at Cook County Hospital and 1 in private practice), in which the diagnosis was corroborated by X-ray or operation or both. The frontal sinus was involved in 6 cases, the ethmoid in 5 cases, and the frontal, ethmoid and maxillary were involved coincidentally in 3 cases. There was one case of giant mucocele of the frontal sinus with absorption of the floor of the sinus from pressure necrosis. There were 3 cases of acute sinusitis and 4 chronic sinusitis cases. In children the sinusitis was acute, while in adults it was chronic. The onset occurred after acute rhinitis in 3 cases. There was a history of nasal stoppage in 2, of nasal discharge in 2, and a history of previous swelling of the orbit and lids in 2 cases. Pus was observed rhinoscopically in but one case. A supraorbital swelling was present in 4 cases, fluctuation in 1 and tenderness over the frontal sinus in 2 cases. Limitation of ocular movement was present in 5 cases, edema of the lid (upper) in 5 cases and chemosis in 2 cases.

Ophthalmoscopic examination was negative. Mortality: 4 recovered and 3 died. Complications were meningitis, extradural abscess, sphenotemporal lobe abscess, frontal lobe abscess, and serpent ulcer of the cornea.

ANATOMY. The accessory nasal sinuses surround the orbit except on its temporal aspect. The nasal wall of the orbit is the thinnest, and is formed by the lamina papyracea of the ethmoid and the lacrimal bone. The superior wall is formed by the frontal bone, which forms the floor of the frontal sinus. The inferior wall is formed by the orbital plate of the maxilla, which forms the roof of the maxillary sinus. The sphenoid sinus is the only one of the nasal sinuses that does not participate in the formation of the bony wall of the orbit. The bony wall of the orbit is lined with a thin periosteum, the periorbita. No lymph vessels or lymphatic glands are contained in the orbital cavity. The rich vascular anastomoses between the nasal sinuses and the orbit predispose to the transference of the infectious processes from the nasal sinuses to the orbital cavity.

The ethmoid, sphenoid, and maxillary sinuses are present at birth; the frontal sinus appears as a distinct cavity, separated from the anterior ethmoid cells at the 7th year. The nasal sinuses do not reach full development until about the 15th year.

PATH OF INFECTION. The mode of infection of the orbit from the nasal sinuses may be from a necrosis in the common bony wall of the nasal sinus and orbit, which results from nasal sinus disease, or from a thrombophlebitis of the veins of the diseased nasal sinus. Other causes are rare, as dehiscence and trauma following operations on the nasal sinuses. The spread of infection into the orbital cavity by the lymphatic route can be excluded because of the absence of lymphatic vessels and glands. The sphenoid and maxilliary sinuses are very rarely the direct cause of orbital complications, because the wall of the sphenoid sinus is not in direct communication with the wall of the orbit, and the orbital wall of the maxillary sinus is very rarely involved in disease of the maxillary sinus.

From the standpoint of the surgical pathology present as a result of orbital exploration, we may divide these cases into two groups, viz., (1) those in which a demonstrable pathologic connection between the nasal sinuses and the orbit is present, such as an area of bone necrosis in the bony orbitosinus wall, with or without a subperiosteal abscess, mucocele or pyocele of the frontal or ethmoid sinuses; (2) those in which no demonstrable pathologic connection is present. In the latter event, if associated with sinusitis, the apparent absence of incriminating surgical evidence is insufficient to exclude the nasal sinuses as a causative factor, because infection thru the small veins common to the sinuses and the orbit via thrombophlebitis cannot be excluded.

A syphilitic periostitis or gumma of the nasoorbital wall may produce a rarefying osteitis and lamellar absorption of the bone, thereby causing a hiatus in the bony wall, which establishes a direct communication between the orbital and nasal cavities, which predisposes to infection being transmitted from the diseased nasal sinus directly into the orbital cavity. Syphilis is frequently associated with nasal sinusitis, orbital phlegmon and exophthalmos.

SYMPTOMS. The symptomatology of exophthalmos due to nasal sinus disease may be divided clinically into two groups, viz., the inflammatory or phlegmonous, and the noninflammatory or neoplastic.

(1) The inflammatory or phlegmonous type is associated with signs and symptoms of phlegmon, such as rubor, calor, dolor, tumor, etc., as in orbital cellulitis and abscess. It occurs more frequently than the noninflammatory type, and is the result of an acute, or an acute exacerbation of a chronic, sinusitis. The onset is sudden, with the acute and stormy symptoms of infection, constitutional and local, as chill, fever, leucocytosis, prostration, intense pain in the eyeball radiating from the orbit. A rather sudden exophthalmos develops, with outward and forward displacement of the globe, with limitation of ocular movement in one or more directions or with com-

plete immobility of the globe. This may be accompanied by diplopia and a reduction of visual acuity. There are local signs of inflammation present, as edematous swelling of the upper eyelid, chemosis, localized swelling at upper inner quadrant of orbit, which is tender to palpation. The eyeball may also be exquisitely tender. The course of the disease is acute, the symptoms develop rapidly, so that the height of the symptoms occurs at the end of the first week, or sooner. The presence of a fistulous tract, which may or may not be discharging pus, or the presence of a healed fistula in the upper eyelid signifies a necrosis of the bony wall of the frontal sinus.

(2) Noninflammatory or neoplastic type, e. g., that which occurs with mucocele or pyocele of the frontal or ethmoid sinuses, which is characterized by a gradual onset, without any signs of phlegmon, a chronic course, with gradual development of exophthalmos and discoloration of the eyeball, unaccompanied by pain or sensitiveness. By deep palpation, a circumscribed globular swelling may be felt, arising along the floor of the frontal sinus or the lamina papyracea of the ethmoid. Deep pressure on the mucocele or pyocele may cause mucus or pus to appear in the nasal cavity. The mucocele and exophthalmos may be intensified by an attack of acute rhinitis. Forceful blowing of the nose may exaggerate the exophthalmos or the tumefaction (mucocele or pyocele) in the orbit. When the exophthalmos and associated displacement of the globe with limitation of ocular movement is marked and has extended over a long period of time, and the globe cannot be compressed into the orbital cavity, there is usually marked diminution of visual acuity from pressure on the globe and the optic nerve. These cases may be very difficult to differentiate from benign orbital neoplasms.

The ocular signs of orbital tumefactions depend largely on the location of the latter within the orbital cavity In a general way, the mechanical effect of pressure within the orbit is in the opposite direction from the source of the pressure. In exophthalmos due to inflammatory and noninflammatory orbital complications of nasal sinus disease, the position of the proptosed eyeball is usually an indication of the nasal sinus involved. The direction of the dislocation of the globe from frontal sinus disease is forward, outward and downward; from the anterior ethmoids, forward and outward; from the posterior ethmoids and sphenoid, straight forward; and from the maxillary sinus, forward and upward.

Based upon the results obtained by rhinoscopic examination, we may divide the cases of exophthalmos into two clinical groups; (1) those with positive evidence of suppurative sinusitis, and (2) those with negative findings. In the latter group, we may obtain a history that points definitely to nasal sinusitis as the causative factor, but which on examination shows no purulency. A case of this character may be one of closed empyema of the nasal sinus without drainage into the nose, or a sinusitis which has cleared itself by previous drainage of the pus into the nose, or by the discharge of the pus thru a fistula onto the skin surface, or by the evacuation of the pus thru the formation of a subperiosteal abscess, or by draining directly into the orbital cavity thru a fistula, or rupture of a subperiosteal abscess. In these cases, where the nasal mucosa may be normal and the turbinates neither swollen nor congested, and also in the cases with presumptive evidence of sinusitis, as shown by swollen and congested turbinates with abnormal mucosa, associated with polypi or polypoid degeneration of the middle turbinate, etc., the nasal sinuses should be subjected to an intensive rhinologic study, in order to determine whether the nasal sinuses are the causative factor and if so to localize the sinus or sinuses involved.

Differential Diagnosis. Monocular exophthalmos, due to any and all causes, should be differentiated from that caused by nasal sinus disease.

(1) The inflammatory or orbital phlegmon type must be differentiated from that caused by trauma, infection about the head other than nasal, and those due to metastasis from remote septic conditions.

(2) The noninflammatory or neoplastic type will have to be differentiated from the most common cause of the noninflammatory orbital tumefaction, i. e., a true orbital neoplasm, benign or malignant, more frequently the former. In all of these cases syphilitic gumma and periostitis must be thought of and excluded by the Wasserman test, an intensive therapeutic test, the absence of signs of syphilis elsewhere in the body and negative history. Vascular tumors must be excluded; they are characterized by the presence of abnormal pulsation, bruit, and reducibility of the exophthalmos by making pressure on the globe. Other causes of a unilateral exophthalmos, altho not so frequent, must be thought or, as orbital hemorrhage from trauma and certain blood dyscrasias, as scurvy; also relaxation of the extraocular muscles from ophthalmoplegia or extensive tenotomy; tenonitis; cavernous sinus thrombosis and exophthalmic goiter.

Prognosis. (1) as to life: Orbital phlegmon is invariably fatal when associated with some intracranial complication. Birch-Hirschfeld states that 17% of all cases of orbital phlegmon died from meningitis, brain abscess or cavernous sinus thrombosis. (2) as to vision: Roemer states that 20% of orbital phlegmons due to all causes are followed by blindness. Involvement of the optic nerve may be mechanical from pressure on the optic nerve; or from absorption of toxins from the infected sinuses or orbit, and the loss of visual acuity may be partial or complete.

Treatment. (a) The indications for operation: As soon as the diagnosis of an orbital complication of sinus disease has been established, the case becomes one for immediate surgical intervention. Unless prompt surgical measures are taken to evacuate pus in the orbital cavity, there may be considerable danger to life. The pus may burrow along the periorbita to the sheath of the optic nerve and result in an intracranial complication as meningitis, extradural or brain abscess. An extension of thrombophlebitis of the orbital veins into the cavernous sinus will result in a cavernous thrombosis. (b) Types of operation: There are four methods of surgical procedure, viz., (1) the intranasal operation, (2) the external operation, (3) the combined intra- and extranasal operation, and (4) the immediate drainage of the orbital abscess with a subsequent intranasal operation after the acute phlegmon of orbit has subsided.

Of the four methods, the external or combined external and internal only will be considered. It is only by external exploration of the orbito-fronto-ethmoid wall that the pathology can be definitely ascertained and adequate drainage established for both the orbital cavity and nasal sinuses. A Killian incision is the best for the orbito-fronto-ethmoid operation, as it best exposes the common bony wall of the orbital cavity and the nasal sinuses to inspection and palpation, and discloses any dehiscence, bone necrosis, bone absorption, fistula, subperiosteal abscess, mucocele or pyocele, polypi granulations or diseased mucosa of the sinuses. All diseased tissues must be thoroly removed and free drainage established between the orbital cavity and nasal sinuses by rubber tube drainage tube, draining thru the nose. There are two foci of infection, the orbit and the infected nasal sinus which must be drained, and this is done best along the original route of infection.

It is essential not to make undue pressure in the orbital cavity with the drainage tube and gauze packing, on account of the danger of producing pressure on the optic nerve, which, if excessive and continued, may result in optic atrophy and blindness.

4100 W. Madison.

NOTES, CASES, INSTRUMENTS

SCLEROCONJUNCTIVAL SUTURE IN CATARACT EXTRACTION.

F. H. VERHOEFF, M.D.

BOSTON.

In 1916, I published a short paper[1] in which I incidentally described a new method of wound suture in cataract operations. In 1923 Dr. Derby[2], and in 1924 Dr. Howard[3] reported their experiences with this method, and in the May issue of this JOURNAL Dr. Derby describes a modification of it which he believes to be superior to the original method. This modification had previously occurred to me, and in 1917, I gave it a thoro trial because it obviously possessed the advantage now noted by Dr. Derby, namely the ease and rapidity with which the wound could be closed by simply pulling the threads taut. At that time I used this modification in every case of cataract extraction for four months and then abandoned it because I found that it had a serious disadvantage. This lay in the fact that when the suture was tied it not infrequently pulled too strongly on the conjunctival flap and caused more or less overriding of the lips of the wound thus delaying the reformation of the anterior chamber. This was evidently due to the facts that the two needles could not always be inserted in the sclera with sufficient accuracy and that, in addition, the needle holes sometimes stretched open too widely when the suture was tied. I therefore returned to my original method and have since employed it in every case.

As an objection to this method Dr. Derby states; that in order to prevent opening of the wound I employ an assistant to hold the conjunctival flap down while the threads are being pulled thru it, preliminary to tying the suture. Within the past year or two, however, I have obviated this objection. I have found that by pulling one thread outward and slightly downward with one hand, and at the same time pulling the other thread inward and downward with the other hand, the flap comes promptly in perfect position and closes the wound. This little detail as well as others are difficult to explain without actual demonstration upon a patient, but greatly facilitate the operation. It is very important that the needle holes in the conjunctival flap correspond exactly in position to those in the sclera, otherwise the conjunctival flap may be displaced sidewise. I find that the simplest way to get the loops of thread out of the way before the cataract incision is made, is first to pull the threads taut and then insert a strabismus hook under the flap and pull out the two loops to the extent desired. It is not necessary or desirable to have the loops so large as shown in the illustrations of Dr. Howard's and Dr. Derby's. In tying the suture, I employ a "granny" knot, because this will remain tied sufficiently long, and if it becomes untied in three or four days removal of the suture is simplified. The use of this suture need not increase the time of the operation more than two minutes.

While I do not think that this method of wound suture is a perfect solution of our problem, I have found it so advantageous that I never dispense with it. Since employing it I have not lost an eye from postoperative expulsive hemorrhage, resulting from paroxysms of coughing or vomiting, and I can recall only two cases of infection. In cases of loss of vitreous I think its value, while great, has been overestimated. The suture is especially effective when the corneal section is small. In the case of patients who are known to be subject to paroxysmal attacks of coughing, for several years I have employed three conjunctival flaps instead of one. The suture for the middle one is inserted as usual, but the other two are simply inserted in the sclera, laid out of the way over the forehead, and not passed thru the flaps until after the extraction has been completed. Dexterous operators might find it advantageous to employ two flaps as a routine method.

When a suture is employed, it is of course especially important that the

operative field be made as sterile as possible. I therefore paint the exposed skin in the operative field with tincture of iodin (2%) and place a sterile gauze mask over the nose and mouth of the patient. Removal of the suture is a simple matter if properly done. I generally remove it in about a week, but in unruly patients have allowed it to remain over two weeks or until it came out spontaneously. For anesthesia I employ a 20% solution of cocain containing one-sixteenth of one per cent. zinc sulphat, applied by means of a cotton tipped tooth pick. (The zinc sulphat is added to maintain sterility of the solution as regards pathogenic microorganisms.) The cotton is held in contact with the flap for about half a minute. The upper lid is raised by the left middle finger and the free ends of the suture grasped with a small forceps held between the left thumb and forefinger. The loop is then quickly cut with one quick snip of the scissors blades—not of the points—either thru the knot or just beneath it. The remainder of the loop may then easily be pulled out with the forceps.

82 Commonwealth Av.

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BABBIT METAL IN THE LENS WITHOUT LENTICULAR OPACITY.

DONALD J. LYLE, M.D.
CINCINNATI, OHIO.

The diagnosis of an intraocular foreign body is made from the history of the injury: the presence of a wound entrance; by seeing the foreign body in the eye by means of light, with lenses, loups and ophthalmoscopy: and, if the foreign body is in the lens or has passed thru it, by lenticular opacities: and by X-ray, and transillumination.

It is well to examine an eye under a mydriatic and to have an X-ray of all suspicious cases, as occasionally the presence of an intraocular foreign body may be overlooked. For illustration I wish to report the case of a man who has had a piece of babbit metal in his eye since Oct. 30, 1922, the date of injury, which neither the injured man nor his attending oculist knew was present, tho it could readily be seen in the lens under mydriasis. The most interesting unusual feature is that there is very little if any opacity surrounding the foreign body, the vision not being impaired by its presence.

In May, 1924, as special eye examiner for the Industrial Commission of Ohio, I was requested to examine this claimant who, "was injured in October 1922 while chipping babbit, a piece having struck him in the eye." The medical report shows "linear cut of cornea of right eye, near center, infected ulcer following."

The man was examined by me May 17, 1924. The orbit, globe and lids were normal. There was a central, linear, corneal scar of his right eye in the vertical axis about two millimeters long and one wide. There was a thread like white opacity in this scar which does not disturb the surface contour of the cornea enough to distort the images of an ophthalmometer. The iris margin in the left lower quadrant was torn and adherent to the anterior surface of the lens and surrounded by some opaque products of tissue reaction or infection. Above this, nearly in the horizontal plane and imbedded in the substance of the lens was seen a highly refractive, silvery looking object, evidently a piece of bright metal. An X-ray showed the presence of an opaque body 2 by 1 by 1 mm. and located it as shown by accompanying chart.

This object, no doubt, was a piece of babbit which, being free from infection and of nonirritating chemical nature had lodged in the lens without causing

reaction. Furthermore the lens capsule must have been immediately coapted or the wound plugged by the torn iris so that the aqueous did not enter the lens and caused swelling and disassociation of the lenticular substance.

An examination of the vitreous did not show the presence of any abnormality in that body. The disc and blood vessels were normal in appearance and the retina showed no lesion. An examination of the left eye showed nothing abnormal.

The blind spots were normal in size, in both eyes. Tension was normal. Vision in the right eye was 20/70 corrected to 20/30 plus with a sphere minus 1.50 combined with a cylinder minus 0.50 axis 90. The vision in the left eye was 20/50 corrected to 20/20 by a sphere minus 1.00 combined with a cylinder minus 0.50 axis 90.

As there was no opacity in the right lens I recommended that nothing be done to the eye for the present and that the case be held under observation. As a magnet cannot be used to extract babbit the whole lens would have to be removed. And as there is no opacity or solidification of lenticular substance an intracapsular operation would have to be resorted to with some risk as it would be hardly possible to extract the lens and foreign body if the capsule were opened.

BINOCULAR VISION AFTER UNILATERAL TRAUMATIC APHAKIA.

J. J. Horton, M.D.

EAGLE PASS, TEXAS.

Because of the rarity of this condition I report the following case:

M. M., age 33, in good physical condition, electrical engineer at a coal mine in Coahuila. The only previous sickness of any consequence was shell-shock. Jan. 3, 1925, forenoon, struck in right eye with a piece of metal of unknown size.

Jan. 4, I saw him for the first time in the evening of this date. The lids of the right eye were slightly swollen and reddened. The conjunctiva was slightly injected, but the eye as a whole was remarkably clear considering the extent of the injury. There was a lacerated wound of the cornea reaching from the limbus at two o'clock to almost the limbus at seven o'clock. The iris was tightly incarcerated in the corneal wound. The lateral periphery of the pupil was rounded; the medial was fixed in the wound of the cornea. The anterior chamber had reformed to the extent allowed by the incarcerated iris. The aqueous was clear. A translucent lens prevented a view of the fundus. It did not bulge into the anterior chamber. The patient complained of a little pain. He stated that it had been severe the first five or six hours after the injury. The left eye was normal.

A junior medical student of the Universidad Nacional of Mexico City had given first aid, consisting of atropin and cold applications. As the iris was so tightly adherent, I made no attempt to replace it. Atropin and sterile vaselin were instilled and a light bandage applied. The cold applications were discontinued. Daily instillations of one per cent atropin and rest in bed were ordered. I did not see the patient again until Jan. 10th when he came to my office.

Jan. 10. The conjunctiva was somewhat more injected. The corneal wound appeared to have made no progress in healing. The swollen lens made the anterior chamber very shallow. The tension was elevated to the touch, but a tonometer reading could not be taken on account of the wound. The pain had been severe for about three days. A large amount of lens material was allowed to escape thru a keratome incision at the upper part of the limbus. The eye was dressed as before. Thirty grains of bromides were given that night, and the patient has experienced no pain since.

Jan. 31. The lens capsule was needled. This operation was followed by a mild iritis. After observing the process a few days I allowed him to return to Mexico, with instructions to remain in bed and continue the atropin until the eye was quiet.

March 1. I saw him in Mexico where there were no facilities for a careful examination. The eye was clear; the corneal wound had completely healed; most of the lens material had been ab-

sorbed. The patient stated that his vision was improving.

March 4. There was no apparent objective change. The patient stated that his vision was much better.

April 10. The lids, ocular movements, and conjunctiva were normal. There was a slightly raised, white, linear scar of the cornea, extending from the limbus at two o'clock to almost the limbus at seven o'clock. The cornea was otherwise clear. The incarcerated iris deformed the pupil into a half oval shape. The pupil was black, and dilated well with one per cent homatropin. With the loupe and oblique illumination, two wide vertical bands of lens capsule could plainly be seen in the pupillary area, one on either side of a delicate network. The details of the fundus could not be made out; but the disc could be pretty well outlined and the larger vessels followed with plus 8 to plus 10 lenses.

Without any correction the patient was able to count fingers at ten feet, could recognize friends and could find coins scattered on the floor. He could read the tenth section on the near vision chart, and with a pinhole disc he could read the smallest type.

With plus 7.00s with plus 5.50 cyl. axis 80°, his vision in the right eye was 6/7.5. With this correction he read the sixth section of the near vision chart, and with a pinhole disc added he read the smallest type. Unfortunately, his visual acuity and refraction before injury are not known.

The field of vision in this eye, roughly, was good, except nasally.

V. O. S. 6/12. With minus 1.50 axis 135° equals 6/7.5.

With corrections V. O. U. equals 6/5 minus 2.

This marked increase in binocular over monocular visual acuity in this patient has been noted on several subsequent tests.

With corrected binocular vision he was conscious of two images, a small, distinct one superimposed upon a larger, less distinct one. This disturbed him only when looking at moving objects. When looking at stationary objects he preferred both eyes corrected, declaring that he saw better. No muscular imbalance could be demonstrated.

In view of the fact that his work is at times dangerous I would not risk prescribing glasses with both corrections. He is now wearing with comfort O. D. plano, O. S. minus 1.50 axis 80°.

The points worthy of note in this case are (1) the increase in visual acuity from 6/7.5 with either corrected eye separately to 6/5 minus 2 with corrected binocular vision; and this in spite of being conscious of two images. (2) The range of good vision in the aphakic eye.

A PUZZLING EXTRAOCULAR MUSCLE PALSY.

WARREN S. REESE, M.D.
PHILADELPHIA, PA.

E. C., age 8, was first seen April 25th, 1924, and complained of bilateral temporal pain and diplopia. The parents had noted that the left eye turned in at times. On examination the ocular movements appeared normal tho at times the left eye turned in, as if there were a spasm of the left internus. The pupils were dilated and reacted very little to light.

There was a choked disc of about 3 D. in each eye.

The patient was referred to Dr. Frazier's service at the University Hospital where, thru the courtesy of Dr. A. G. Fewell, he was further studied. In about two weeks it was noted that the right eye lagged on looking to the right. At this time on moving the finger from the patient's left to his right, when the primary position was reached the left eye began to turn in, soon after which the right began to lag. As the finger was carried farther to the right both of these conditions became more marked, the left eye turning in markedly and the right lagging, the patient being unable to abduct the right eye much more than 15°.

What probably happened here was that in moving the finger from left to right, as the primary position was reached, the right eye, in which there was slightly better vision (20/20— as compared to 20/30—), took up fixation, and the secondary deviation of the left internus, consequent to the primary deviation (paralysis) of the right

externus, began to manifest itself. As the finger was carried farther the primary deviation or paralysis of the right externus became manifest. It seems strange, however, that on reaching the abducting limit of the right eye, fixation did not change to the left eye.

If spastic conditions, such as this patient first exhibited, are thought of as possible secondary deviations, a beginning palsy in the other eye can be recognized earlier, or if immediate operation is demanded, a tentative diagnosis may be of great assistance in locating the brain tumor.

230 South 21st Street.

SOCIETY PROCEEDINGS

ROYAL SOCIETY OF MEDICINE, LONDON.

Section of Ophthalmology and of Comparative Medicine

FRIDAY, MAY 8TH, 1925.

SIR ARNOLD LAWSON, K. B. E., President, Section of Ophthalmology, in the Chair.

Snowball Vitreous Opacities.

MR. A. HUGH THOMPSON showed a case of "snowball opacities" in the vitreous of one eye. The patient was a man aged 62, and his right vitreous was filled with round white bodies. which moved in all directions with every movement of the eyeball. The fundus appearances were normal, and the condition did not appear to be detrimental to the vision; which was 6/12 in the right eye, 6/18 in the left. The condition was referred to by de Schweinitz, who alluded to two American authors with whom originated the term "snowball opacities." The little bodies were larger and duller than cholesterin crystals. He had not previously seen a similar condition. Some had suggested it might be a congenital matter, but this man did not notice anything amiss until late years.

Discussion. MR. T. HARRISON BUTLER said that in a case of his with a similar appearance, the man had since developed a very resistant glaucoma.

Tubercular Keratitis in a Cat.

MR. HAMILTON KIRK exhibited a cat with tubercular keratitis in an early stage. He said the disease was frequently met with in these animals, and he expected this cat to develop other lesions later, such as retinal detachment. This cat could be felt to have some irregularities on the kidneys, probably tuberculous. He said that ocular lesions were frequent in distemper in both dogs and cats; 60 per cent of dogs with distemper seemed to have eye troubles. The nearest human disease to distemper was measles, and in this latter eye conditions were not infrequent. In dogs the eye affection seemed to be due to spread of infection thru the nasal duct, but this would not explain it in those cases of distemper, in the early stages, in which there was no nasal discharge. The first indication often was a milky opacity of the cornea. This might pass away, or it might persist for weeks and result in ulcerative keratitis. There was, he said, a catarrhal form of distemper in cats, with much chemosis and protrusion of swollen conjunctiva over everted lids. The animal had photophobia and suffered much pain, and a creamy material glued the lids together.

Discussion. MR. HUMPHRY NEAME referred to a paper by the late Mr. Coats, describing 8 cases of tuberculosis in cats, in all of which both eyes were affected. In those there were masses of tuberculosis in the choroid, and various degrees of retinal detachment.

Keratitis in Animals.

MR. HUMPHREY NEAME opened the discussion on Eye Diseases Common to Man and Animals, a discussion on parenchymatous keratitis in animals, by an epidiascopic demonstration of slides of cases of various kinds. The first case was that of an animal whose eye was ruptured by a turnip being thrown at it. In five days a very acute affection of the eye had taken place, and clouds of nuclei could be seen between the lamellae. The anterior chamber, between the cornea and iris, was occupied by purulent material, and

there was a layer of pus between the ciliary body, the iris and the lens. There was active suppuration, and large numbers of polymorphonuclear leucocytes were evident in the section. The greatest area of infiltration was a little way from the center of the cornea. In another slide there was shown an attempt at repair, and extensive vascularization was seen, polymorphonuclear cells giving place to a round celled infiltration.

Another slide showed a similar condition, but less acute, in a guinea pig; and here the state of affairs was only ascertainable by histologic examination. Clinically, the cornea was intensely opaque thruout, and during life there was an irregularity in its center. But there was no clue to the nature of the condition until a section was made. This guinea pig had probably been scratched by another on the eye. A section towards the edge of the wound showed an attempt at the process of repair, a downgrowth of epithelium filling up the edges of the wound. The remainder of the cornea had largely lost its pattern, and there was a marked cellular infiltration. In the swollen part there was a dense network of capillaries, and a proliferation of connective tissue.

With regard to *tuberculosis* in the eyes of animals, he showed on the screen a section from a cat's eye. The animal was examined clinically before death, and one retina was found to be detached, and both eyes were blind. There was present a typical parenchymatous keratitis, and an intense infiltration with lymphocytes, with a mass of cells at the back of the iris. Cells were found scattered on the posterior surface of the cornea. Tuberculous parenchymatous keratitis occurred by extension from neighboring structures. Here was seen an almost staphylomatous condition at the corneoscleral junction.

The next slide showed the eye of a rabbit infected with tubercle from the subcutaneous inoculation of a tuberculous culture, of bovine variety. A tuberculoma was seen at the corneoscleral junction. In another slide of the same eye there was marked papillitis, and the tuberculous process had extended into the optic nerve.

He also showed a drawing of a piece of the cornea of a dog, which was affected with *distemper*. When the dog was seen clinically, the cornea was full of a network of vessels. In distemper there was a great variety in the eye lesions, as was the case too in tuberculosis.

Ulcerative Keratitis in Animals.

MR. HENRY GRAY, speaking as a veterinarian, gave a contribution on ulcerative affections of the cornea, their complications and sequelae. He said that in the horse corneal ulceration might occur in association with influenza, swine fever, trypanosomiasis, rabies, and from infections of the conjunctiva. In the dog this ulceration might be a sequel of paralysis of the optic division of the fifth nerve, or of tumors involving the roots of the nerve. In the comparatively thick corneas of the horse and cat, excavated ulcers were seen, but repair readily took place. These ulcers were accompanied by intense photophobia, lacrimation, and intense blepharospasm. For the last named symptom he advised the instillation of cocain drops with the object of relieving the conjunctival congestion.

Cataract in Horses.

MR. A. F. MACCALLAN and MR. HERBERT MASON offered a joint paper on cataract in horses, with references to iritis. It set out many interesting experiences of the authors in Egypt, where they had the advantages of an ophthalmic hospital and a government veterinary school with an out patient clinic, and a slaughter house for most of the worn out horses. Mr. MacCallan said that the mere presence of one or two opaque dots in a horse's lens might not interfere with the animal's efficiency for riding or draft purposes, but an extension of the opacity would render it useless for the saddle. Such animals should not be used for breeding, as most cataracts in horses were hereditary. It was not many horses on which it was worth while to do a cataract extraction. He described the operation he did for this extraction on the horse.

Horses had a condition of iridocyclitis known as "periodic ophthalmia." Animals so affected suffered from photophobia, inflamed conjunctivae, and had a hazy cornea, but not corneal ulceration. When this was present it was impossible to keep the pupil dilated with atropin. In severe cases of the disease the pupil became blocked. His own belief was that the disease was not contagious, and he had not found it possible to reproduce it in a healthy horse by inoculating humors from a subject of the disease. He thought it was an ocular complication of some general disease. Postmortem, besides the appearance already referred to, there were opacities of the lens, and flocculent opacities in the vitreous.

Ocular Disease in Animals.

Discussion. GENERAL SIR JOHN MOORE spoke of diseases in the eyes of horses, basing his remarks chiefly upon his experiences in France during the War, when he was responsible for the veterinary records. During the Great War there were 36,690 cases of eye disease in horses in France, 19,813 being cured, 2,558 were destroyed, and 9,723 were cast and sold, the carcasses being much sought after as food. The majority of these affected horses had specific or recurrent ophthalmia, called by some periodic ophthalmia. This was regarded as so serious that a conference between French and British veterinarians was held, at which the disease was discussed. It was agreed that it was a recurrent iritis; the "moon blindness" of old coaching days.

The animals with the disease mostly looked fat and well, and at a horse show some of them took prizes! At one period there were upwards of 2,000 animal under treatment for the disease. Some considered it was contagious, but the majority did not share that view. The bacteriologic examinations which were done did not reveal any specific causal organism, and it was regarded as equally prevalent in horses stabled and in outside standing. The water did not seem to have anything to do with it. Each case received an injection of 1 c.c. lugol solution into the supraorbital fat, and the animals were subsequently evacuated to hospital. His own view was that the presence of much manure and urine had much to do with causation. Seven hundred and fifty thousand horses were taking part in the war, and 1.4 per cent of the strength had this disease.

MAJOR DUNKIN said that in dogs with distemper, eye lesions were common where the disease became chronic. In the ferret, eye disease was one of the first indications of distemper. Keratitis in distemper in dogs was always preceded by a conjunctivitis, which was accompanied by a profuse secretion of tears.

MR. M. B. OLIVER said he saw many cases of periodic ophthalmia in horses in France during 1918, and many of those animals were obviously ill; they had iridocyclitis, with enormous exudates in the anterior chamber. He obected to the name, as it did not describe the disease.

MR. HENRY GRAY, in reply, said that opalescent keratitis presented the appearance of opalescent glass, there was no vascularity, and it usually arose from distemper. Specific ophthalmia occurred during the Napoleonic wars.

MR. GRAY CLEGG spoke of cases of hairy mole on the cornea in dogs.

MR. HARRISON BUTLER referred to difficulties he encountered when doing a cataract extraction on a King Charles spaniel belonging to a friend. He said that on two occasions he had removed dermoid cysts from dogs' eyes, under cocain, and there was no trouble.

DR. RAYNER BATTEN also gave some experiences with eye diseases in animals, and remarked on the readiness with which interstitial keratitis was set up in the dog. Owners of dogs seemed very averse to anything operative unless an absolute cure could be promised.

PROF. WOOLRIDGE said that, in his hands, the treatment of glaucoma in the dog had been most unsatisfactory. He agreed that extensive opacity occurred in these animals on slight provocation. It seemed best to flood the eye at frequent intervals. Dermoids on the eyes of dogs were easy to treat; the growth could readily be dissected away.

MR. E. TREACHER COLLINS spoke of a covey of pheasants at a shoot, which refused to rise for the guns, and it was found that they could not see. One was sent to him for examination, and he found it had a vascular cornea, there was typical interstitial keratitis and a large cellular exudation, with a marked development of vessels in the substance of the cornea. He asked whether veterinarians often saw sympathetic ophthalmitis in animals. He thought the horse disease which had been mentioned was better called "periodic ophthalmitis." He also had seen dermoid growths on the eyes of animals, and he had sections of a pig's eye with bristles sprouting from the cornea. In the Museum of the Royal College of Surgeons there was a specimen of a sheep's eye containing a tuft of wool.

MR. TUDOR THOMAS spoke of a case of sympathetic ophthalmitis in a pet dog, one eye having received an injury, and the other eye was involved sympathetically.

MR. A. L. WHITEHEAD questioned the reality of the supposed recovery of the clarity of the cornea in animals which seemed to have recovered.

DR. G. MACKAY said he had been impressed with the facility with which keratitis occurred in the dog, but it also cleared up quickly. He showed a drawing of the case of a fox terrier, whose lenses had come too far forward, and were spontaneously dislocated into the anterior chamber. In the other eye the anterior chamber was quite filled with a dislocated and cataractous lens, and he undertook to remove the eye in which no pupil could be seen; but he miscalculated the size of the needed incision. Compared with the human, the dog's lens seemed hard, large and round. No sepsis occurred.

H. DICKINSON,
Reporter.

ROYAL SOCIETY OF MEDICINE, LONDON.

Section of Ophthalmology.

SIR ARNOLD LAWSON, President.

Friday, June 12th, 1925.

Massive Exudate in Retina.

DR. RAYNER D. BATTEN showed a man aged 64 who had a massive exudate in the right retina, and some exudative changes in the left. He had been under observation since 1922, when he had an extensive vitreous hemorrhage in the right eye, and some retinal hemorrhages and white patches in the macular area in the left. The blood pressure was reported to be 135 to 85, there was neither sugar nor albumin in the urine. The central nervous system was normal, and the Wassermann negative. A year later the vitreous hemorrhage had cleared up, and the condition was as now seen, except that it had been very slowly increasing.

Tumor Compressing Tracts, Chiasm and Nerves.

MR. LINDSAY REA showed specimens and sections from a patient who had a tumor 40 mm. in diameter, yet who only presented sudden blindness of the right eye about Christmas time. A fortnight after the blindness he went to his family doctor and reported it, and Mr. Rea was subsequently asked to see him. He and eight others examined the eye, and there was nothing abnormal to be detected in the optic disc, and no change in the appearance or calibre of the vessels. Nasal and neurologic examinations yielded nothing; but a fortnight ago in the left eye —which had remained normal—there was the beginning of papilledema. As the pressure in his left eye was rising rapidly, he was X-rayed, and all that was seen abnormal was a flattened sella turcica, and the erosion of one of the sphenoidal sinuses thru the bone. Two days later the man died of a meningitis, which spread from the base over the general brain surface.

Discussion. DR. W. E. CARNEGIE DICKSON, who made the drawing and did the postmortem examination, said he thought the tumor probably originated in the pituitary body, but the specimen had not yet been cut and fixed.

DR. A. FEILING said he saw the man at Mr. Rea's request and could find no cause for the blindness; there was no symptoms suggesting intracranial lesion, nor of endocrin disturbance.

MR. F. JULER remarked on the long time which was taken in the optic atrophy developing.

Mr. Herbert Fisher discussed the case at some length; remarking that there might not have been any gross erosion of the sella turcicia, but some unusual anatomic arrangement of the cavernous sinus on that side, which enabled the growth to extend in that direction without much opposition. There had been gross stretching of the right optic nerve, that had probably induced the early blindness, rather than a compression of the fibers of that nerve between the tumor and any bony structure at the base of the skull.

Mr. Rea replied that originally the optic nerves were in their due anatomic relationship, but the sella turcica was eroded and flat. There had been no disturbance of the visual field in the left eye, and there had been no approach to hemianopia.

Pulsating Exophthalmos.

Mr. A. E. A. Loosely presented a patient with a pulsating exophthalmos. When he first saw the case there had been diplopia and weakness of the external and inferior recti, for 6 months. In each eye the vision, with correction, was 6/6. When he saw the patient again a fortnight later, there was protrusion of the eye, the lids were brawny, and the eye could not be seen between them. A bruit was not only very obvious to the patient, but it could be heard by others also. Three days later Mr. Keer tied the external and internal carotid arteries. There was no history of injury or of venereal disease, Wassermann was negative, and X-rays showed nothing abnormal in the skull.

Epibulbar Sarcoma.

Mr. Geoffrey Viner showed a lady, age 31, who complained of a black spot in the left eye, which had been growing for 9 months. His diagnosis was based chiefly on his slit lamp investigation. It showed pigmentation extending down into the deeper layers, chiefly substantia propria.

Discussion. Sir John Parsons thought this was probably a pigmented nevus or mole of the conjunctiva, a common situation for such tumors, which did not often show malignancy. Still, there were some unusual features, and he suggested that first the piece of conjunctiva should be dissected off, and have a microscopic examination made before deciding to operate radically.

Mr. Ernest Clark agreed with Sir John. He had what seemed to be a similar case years ago, but a little deeper, and he removed the eye. Death occurred 5 years later from sarcoma of the liver.

Operative Treatment of Lacrimal Sac.

Mr. G. H. Pooley, of Sheffield, said those who had to deal with ocular troubles in a large industrial area met always many cases of dacryocystitis. It was a condition about four times as frequent in women as in men. His aim was to find a quick and efficient method of dealing with these cases in a radical manner.

He classified the defects in this region which the surgeon might be called upon to treat, as stenosis of the puncta. Stenosis of the canaliculi just before they joined the sac. Obstruction in the sac itself without retention or regurgitation of inflammatory products. Obstruction with retention of inflammatory products which, on digital pressure, pass down the nose. Obstruction with retention of inflammatory products, which on pressure pass thru the puncta into the conjunctival sac. In all the foregoing, the inflammation appeared to be confined to the interior of the sac.

In a numerous, and far more serious, group the tissues round the sac were somewhat acutely inflamed. In many there was abscess and death of bone. Many presented large red swellings, which might have burst before the ophthalmic surgeon saw the case. The puncta might need incision or a three-snip operation. Obstruction of the sac without regurgitation might be kept quiet without operation, but if necessary operation could be done. Distention of the sac whose contents could be squeezed down into the nose required merely digital pressure by the patient, combined with the application of antiseptic lotions. Cases of distention of the sac the contents of which regurgitated on pressure but were apparently free from external inflammation gave good results if excised after

having been injected with antiseptic dye. Even here a permanent drain into the middle meatus of the nose prevented epiphora.

Most trouble was caused by the suppurative cases. These he had long been content to drain, then foment until they were quiet, when he excised them, removing at the same time the lacrimo-ethmoidal cells and any dead bone. In a good number abscesses subsequently formed, probably due to dead bone. And a disadvantage was the length of time required to complete the treatment, for it was irksome to the patient, and threw a heavy strain on a busy department at the hospital.

He next tried incision of the inflamed sac, removing the lacrimo-ethmoidal cells and scraping the nasal duct. This gave fairly good results, but there were some recurrences. Some of the patients were free from epiphora, but a larger number were troubled by it There appeared to be no epiphora in the cases, in which a free opening into the nose had been made when removing the cells or dead bone.

Late in 1923 he commenced making an opening thru the sac into the middle meatus of the nose, scraping out the sac and packing firmly into the nose with ribbon gauze, this latter being left in position three days. Two fishing-gut sutures, which had been inserted but left unfastened at the time of the operation, were now tied; and the edges of the skin brought together. The operation only occupied three minutes, the results were satisfactory, and the convalescence rapid. Fluid was syringed thru the lower punctum into the nose on the seventh and succeeding days until the patient returned home.

A further modification of the technic, he had recently tried, was to make a curved incision half an inch long thru the skin, beginning just below the tendo oculi and going thru into the sac. Then taking Lang's sharp spoon and dissector, he passed the dissector down the nasal duct then plunged the dissector into the cribriform part of the lacrimal bone and scraped out the lacrimo-ethmoidal cells. He then took a sharp gouge, 4mm. long on the cutting edge, and cleared up the edges of the opening in the lacrimal bone, and extended the opening upwards and inwards to include the part of the nasal process of the maxilla which was behind the ridge. This opening he plugged with a bundle of thick, thirty-day catgut. This kept open the aperture between the site of the sac and the middle meatus of the nose. He sutured the skin, with two ophthalmic fishing-gut sutures, and if there were skin sinuses or dead bone, he removed them. In septic cases he fomented the wound afterwards, and syringed thru the lower punctum on the seventh and subsequent days.

He had now done the operation in 60 cases, some of them on both sides, and the results were most encouraging. There had been a few cases of recurrence of inflammatory trouble. In the end there was little deformity and little epiphora. The patient's ages varied between 18 months and 70 years. He had had two deaths: one from myocarditis during recovery from the anesthetic, the other from a septic meningitis which had commenced before the operation was done.

Discussion. Mr. W. B. Oliver suggested that Mr. Pooley might try skin grafting in place of the catgut plugs. Mr. Gillie, for a similar operation, used dentist's wax, and covered that with a skin graft.

Mr. A. D. Griffith expressed his preference for the punch over the gouge for removal of the necessary portion of bone.

Mr. J. H. Fisher said he did not see much chance of the operation described by Mr. Pooley having any effect on the epiphora, as there could be no permanent drainage thru the puncta and canaliculi. The drainage which Mr. Pooley provided was of a temporary character, and was for the septic wound in which he was working. He did not think Mr. Oliver's suggestion as to a skin graft was likely to constitute an improvement.

The President said he had hoped Mr. Pooley would have said more about epiphora, as this was not cured by removal of the sac. Most cases could be cured of the suppuration and the sepsis; it was the epiphora which gave the trouble, as in many cases this persisted as if nothing had been done.

Mr. E. D. Davis asked the experience of members in regard to the West operation for dacryocystitis. The successful cases following that operation which he had known were those which were acute. After Mr. Pooley's operation he thought there was danger of a fistula of the face from the nose. He had seen one or two cases of the type in which a sequel of the operation was that mucus came on to the face from the nose.

Sir John Parsons said it did not seem quite clear whether Mr. Pooley operated on mucocele as well as lacrimal abscess. These were different conditions, and the same procedure was not applicable to both. The majority of mucoceles treated by excision of the sac, with clearing out of the upper part of the duct with a sharp spoon, did satisfactorily. As the excretory channels had been obliterated one could not expect the patients to be free of epiphora occasionally, especially in a strong wind, or in emotional stress. Intranasal operations for the condition seemed to be most unsatisfactory. The object of West's operation was to establish a communication between the interior of the sac and the nose. He had no experience of West's operation; but in most of the cases in which it had been done, that he had seen, the opening rapidly closed up, and one was no better off than before. Toti's operation seemed to have given better results.

Mr. Pooley's operation was intended to cut short the treatment of lacrimal abscess, and it stood on a better foundation in regard to that condition. Where time allowed, he found no fault with the ordinary procedure of opening the abscess and packing it to the bottom, and leaving it for a considerable time before doing anything further, even if there was a fistula. The pathology of lacrimal abscess was very different from that of mucocele. In the latter the trouble was confined to the interior of the sac, and in lacrimal abscess there was cellulitis, and if one interfered by operative measures without providing good drainage, the result was unsatisfactory. Mr. Pooley had introduced a method of securing good drainage into the nose, but the procedure seemed to be slightly risky. Unless one was overwhelmed with cases it seemed better to take a little more time; and, when the inflammation had subsided, use the fistula as a guide to the source of the trouble, namely, the remnants of the sac which were left at the bottom. He doubted whether in many cases there was ethmoiditis associated with the lacrimal trouble.

Mr. Affleck Greeves said he would have thought an opening into the nose was something to be avoided; he had seen two cases in which, following the making of such an opening, there was a general infection of ethmoid cells, and the patient had a chronic fistula, which did not clear up until the whole area was evacuated.

Mr. Pooley, in his reply, said his use of dental wax for surgery in the war put him off using it since. Many of the patients he had to deal with did not come until the condition had developed an acute abscess, and in some the abscess had continued some time. He had given a good deal of thought to the question of the persistence of epiphora afterwards. He could not say how many years the opening he made would last, but he always syringed the cases as an after treatment, as he wanted to make the opening durable. Probably the lacrimal gland did not secrete more tears than necessary, except in a strong wind and in dusty conditions. There were some borderline cases of mucocele which were about to become inflammatory externally, and in which an opening into the nose could be reasonably considered.

He understood that the West operation, even in skilled and experienced hands, was a tedious one, and rather too much pneumonia had been said to follow it. If these cases were operated upon from the outside, thru a small incision, there was no deformity, and the condition could be dealt with more thoroly and easily than thru the nose. With regard to the formation of a fistula on the face, if one took away the edges of any sinuses which existed healing generally occurred. He had not had a single case of sinus as an after result. He thought new op-

erative procedures should be regarded from the point of view of the student, and the question asked "Is this better than what was done before? If so, how can we still further improve the procedure in the future?"

The Jullundur Operation for Cataract.

Dr. G. MONTAGU HARSTON read a short communication on the safety limits of the Jullundur operation for the intracapsular extraction of cataract. He said that when Col. Smith introduced his operation for the intracapsular extraction of cataract, ophthalmic surgeons were much struck by the beauty of the operation, and the skill of the originator. That was his own case, and he at once proceeded to carry it out, reserving it for cases in native Indians and Chinese. He had some unsuccessful cases, and at first he could not understand the reason. Then it occurred to him it was probably a question of tension. Chinese were not nervous patients. He found that the safety condition for the operation was that in which the eye tension was the normal, i. e., between 18 and 25 mm. of mercury. Sometimes even 1 mm. tension in excess of normal sufficed to bring disaster to the operation as shown in the loss of vitreous. Since then he had done the intracapsular operation many times, without fear of the results. He could do the operation far more easily with his fingers than with Barraquer's apparatus; the former were more under one's control. The results of Col. Smith's operation, when successfully performed, were brilliant.

SIR JOHN PARSONS referred to his visit to St. Louis and watching Dr. Green operate by the Col. Smith method. He was not favorably impressed by the results; at the same time he thought "show operations" were a great mistake, as, under these conditions, it was difficult to fairly assess the value of a particular operation. His own view was that intracapsular methods must of necessity be accompanied by increased dangers to the patient's eye.

THE PRESIDENT spoke of the need, in this operation, of a skilled and experienced assistant. He did not doubt that the combined operation was much the safer; it was the one he would choose for his own eye. After irrigation of the anterior chamber one could get as clear and black a pupil as by the intracapsular method. He would never do the Smith operation, certainly not on a European.

H. DICKINSON, Reporter.

SAINT LOUIS OPHTHALMIC SOCIETY.

March 27, 1925.

DR. J. W. CHARLES, Presiding.

Hyperphoria as a Factor in Refraction.

DR. F. E. WOODRUFF read a paper published p. 874 this issue.

Dicussion. DR. JULIUS H. GROSS: A young lady, 24 years old, has a slight, mixed astigmatism in one eye, and myopic astigmatism in the other. With correction R. V. = 18/10; L. V. = 18/12. Hyperphoria four degrees; esophoria sixteen degrees. In spite of this high muscular error she had binocular vision as evidenced by the stereoscope. She had never been examined by an oculist, and alternated the use of her eyes as occasion demanded. She did not have headaches, and the correction of the vertical error, or the esophoria was not accepted.

DR. LAWRENCE POST: Dr. Woodruff said that he usually corrected the entire hyperphoria. I have found that small amounts of hyperphoria are often variable and I have obtained good results by correcting only about one-half of the average amount present in each case.

DR. JOHN GREEN, JR.: I was interested in what Dr. Woodruff had to say about the change in the degree of vertical imbalance on looking down. In my own case I found that, altho I have vertical balance on looking straight ahead, I developed one degree of right hyperphoria on looking down. In applying the test to anisometropes, care should be taken that they view the test object thru the center of the spectacle lenses, to avoid the unequal

prismatic displacement of the object when looked at thru the edge of the lens.

DR. H. D. LAMB: I have found as Dr. Woodruff has, that prescribing full or nearly full prismatic corrections in hyperphoria works out satisfactorily and makes the patient comfortable. What Dr. Woodruff did not mention was that sometimes, at the first measurement, no hyperphoria is found; whereas subsequent measurements on different days may disclose one or two degrees. Cases are not infrequent in which a vertically placed prism, as low as one degree, will markedly change symptoms for the better. Dr. Woodruff's suggestion of holding the light, or test card below the level of the eyes in my opinion is all important, for that is the only way in which actual working conditions are simulated.

DR. F. E. WOODRUFF: As a rule I have found that if patients once have hyperphoria—not functional, or dependent upon some general constitutional condition—that hyperphoria remains fairly constant; and they greatly prefer a glass with a correcting prism incorporated. I understand fully that there are functional cases in which hyperphoria is inconstant. As to Dr. Lawrence Post's remarks, my experience has been that these patients stand a full hyperphoric correction, almost without exception.

The Postnasal Sinuses and Their Relation to the Eye.

DR. E. C. SPITZE read a paper dealing chiefly with the anatomy of these parts.

Papillitis with Accessory Nasal Sinus Disease and Nephritis.

DR. C. W. TOOKER read the paper published in full p. 878.

Discussion. DR. E. C. SPITZE: I am inclined to the opinion that the cause lay in a sphenoiditis, or possibly in an outlying cell containing pus that was not reached by the rhinologist.

DR. W. E. SHAHAN: Eleven years ago Dr. Sluder and I cared for a patient, in whom the optic disc was swollen six diopters in one eye, eight in the other. There was diplopia and diminished vision. Both sphenoid regions were operated on by Dr. Sluder. Complete recovery followed. The patient has had several children since and is still in good health.

DR. JOSEPH W. CHARLES: I should like to ask Dr. Tooker if this patient is what we would call a nervous type. Clinically the case seems to present a picture of toxic effect on a sensitive kidney, and a toxic effect on the walls of the blood vessels, to cause increased arterial tension. I do not believe that the depletion from bleeding would account entirely for the rather prolonged reduction of blood pressure, but I do believe that putting the patient to bed and the relief from pain were factors in reducing the blood pressure temporarily. Perhaps the toxemia has now caused a chronic, contracting kidney. In some cases you do not always find albumin, and it is that kind of case in which you have increased blood pressure. I would be tempted to put the patient to bed again to see if the blood pressure will come down; to see if it is a functional rather than an organic lesion in the kidneys. That of course would be a condition for the internist to determine. I had one patient with a considerable increase in blood pressure, which went down decidedly after nasal operation. The rhinologist felt that the relief from pain was what caused the diminution of blood pressure.

DR. W. F. HARDY: The idea that the ocular condition in this case was due to nasal disease should not go unchallenged. There was no concrete evidence that nasal trouble was present, whereas there was good and sufficient reason to believe a kidney lesion existed. I am glad to hear Dr. Tooker did not use the term choked disc. He referred to it as papillitis, which was possibly of toxic origin engrafted upon a preceding kidney lesion. The apparent relief, in the way of lowered vascular tension, following the nose operation, simply indicates that it was due to the rest and depletion to which the patient was subjected.

The amount of swelling of the disc should not be the determining factor in reaching a conclusion as to papilledema or papillitis. There is no reason why the disc may not have as large an

amount of swelling with papillitis as with edema. Furthermore the great and rapid loss of vision in this case would make me believe it was an inflammatory condition in the optic nerve, with which we are dealing. A true choked disc occurring in a nasal condition is inconceivable. How nasal disease can raise intracranial tension is impossible to explain, and I am inclined to take the position of Cushing and other men who do not associate papilledema with any nasal condition whatsoever.

DR. JOHN GREEN, JR.: Great caution should be observed in ascribing to nasal sinusitis an etiologic rôle, in cases which have the clinical aspect of choked disc. The simultaneous occurrence of the two conditions may be purely coincidental. In one of my patients a bilateral choked disc was associated with hyperplastic sphenoiditis. Operation on the sphenoid cells was followed by slow subsidence of the disc swelling and recovery, with partial atrophy. A year later the development of Jacksonian epilepsy led to neurologic and roentgenologic study, which disclosed the present of a calcified cyst of the dura.

DR. H. D. LAMB: I saw this patient when the swelling in the nerves had somewhat subsided. The spots on the temporal side of the nerve were somewhat saffron colored, resembling those present in retinitis circinata, but smaller and not circularly arranged. The typical appearance of albuminuric retinitis was not present. I agree with Dr. Hardy that the papillitis was secondary to chronic nephritis. There was hardly enough nasal trouble to cause such a marked swelling.

DR. C. W. TOOKER, closing: Answering Dr. Spitze, the operation on the sinuses was done rather shortly after entrance, and functional kidney tests were not made until after the operation.

Regarding Dr. Charles' statements as to the nervous element and the effect of pain on hypertension, I would say, that while the girl was of the usual nervous type, she was not suffering pain. Her headaches disappeared before I had seen her, on the development of diplopia. When she came she stated she had loss of vision and diplopia. The pain factor, therefore, hardly enters into consideration.

I agree with Dr. Hardy in the diagnosis of papillitis, and the improbability of choked disc being produced by accessory nasal sinus infection. However, competent men have stated that the differentiation by ophthalmologists between choked disc and papillitis is not always positive.

In a group study, which one should give in all fairness to these cases, one has to be guided somewhat in his opinion as to the etiology and treatment by the combined knowledge and experience of the group, and the opinion of the two men who studied this girl most carefully from every standpoint was, that the condition was a toxic nephrosis. In this opinion I hardly concurred, in view of the continued hypertension and continued albuminuria, and I presented the case chiefly for discussion. The arterial and renal conditions are still unexplained unless they be essential kidney changes without other impairment of health. I hope to see her again in six months, if she is still alive, and trust I may report further.

JOHN GREEN, JR., Editor.

NASHVILLE ACADEMY OF OPHTHALMOLOGY AND OTO-LARYNGOLOGY.

May 18, 1925.

DR. ROBERT SULLIVAN, Chairman.

Neuroretinitis.

DR. HILLIARD WOOD presented Mr. C. A. F., age 28, who first consulted him April 10, 1925, complaining of impaired vision in the left eye for two weeks past. Vision, R. 20/20, L. 20/50. Right eye presents no pathology either externally or internally.

Left eye: Slight general injection. Pupil dilates normally under homatropin. By ophthalmoscopic examination the cornea shows fine deposits; similar to, but not identical with, keratitis punctata. These deposits are more noticeable over the lower half of the cornea, but are not arranged in the shape of a pyramid; the larger ones are below. Faint floating vitreous

opacities. Optic disc blurred in outline. All vessels on the disc hazy and indistinct. No hemorrhages. Two disc diameters below the disc is a spot of chorioretinitis with irregular pigmented borders. Apparently this is a subacute spot, but has extended downward and toward the nose, as an acute retinitis. The acute extension is larger than the disc and is edematous and white. Vessels blurred crossing it. No other fundus changes noted. The diagnosis was made, left eye, of acute neuroretinitis.

Nasal septum moderately deviated to the left. Tonsils septic. Teeth and kidneys appear normal. Wassermann negative. General physical examination negative.

April 11—Tonsillectomy under local anesthesia.

April 22—Rx. bichlorid of mercury, gr. 1/16, and potassium iodid in increasing doses.

May 8—Left eye: Vision 20/30. The intraocular inflammation is gradually increasing; there are marked floating vitreous opacities; blurred disc; dense white spot of retinitis below the disc. Dr. Cullom in consultation advises continuing the mercury and iodid.

May 13—Mercury and iodid discontinued. Rx. sodium salicylat, gr. X after meals and bedtime.

Discussion. Dr. E. B. Cayce believed there was one feature that might throw some light on this diagnosis, i. e. the possibility and, everything else being excluded, the probability, of its being tuberculous. This possibility should be eliminated.

Dr. Robert J. Warner asked Dr. Wood as to his experience in cases of optic neuritis. All other examinations being negative, is it feasible to open the sphenoids, and if opened without finding pus, is there likely to be any improvement in vision from simple aeration?

Dr. Wood: The vision in this eye fluctuated very much, ranging from 20/50 to 20/20 within a period of a few minutes. He thought this variation in vision due to vitreous opacities getting in the line of light. In answer to Dr. Warner's question, he had never operated on sinuses, without some evidence other than the fact that the patient had an unexplained attack of neuritis or other intraocular inflammation. He never felt justified in opening the ethmoids or sphenoids without more evidence. It is sometimes difficult to make a diagnosis even where there is pathology present; but he believed that if one would watch the case continuously, examining it from day to day, he would in most cases within a week or so be able to get some evidence, e. g. some drainage of pus. He had never been able to get any in this case, and never felt that one was justified in doing a sinus operation, purely upon the possibility that pathology might be present and that the case might be relieved.

Iridodialysis.

Dr. Herschel Ezell presented the following case: T. B., 14 years of age, was seen on the 25th day of April, 1925, on account of an injury to his left eye, the result of an accidental discharge of a gun on that same day. The patient's mother stated positively that the shot fell out when she opened the boy's lid.

On examination the left eye was red and inflamed. There was a small wound on the upper lid near its border. This wound was not penetrating, as on everting the lid there was no wound on the opposite side. There was a small slit like wound on the conjunctiva about 2 mm. above the corneoscleral junction and extending slightly into the sclera. Hyphemia was present and the iris was separated from the ciliary body directly above. The gap produced by the iridodialysis was about 4 mm. long and about 2 mm. vertically. The vitreous chamber contained blood in sufficient amount to prevent a view of the fundus. The vision equalled fingers at three feet. Transillumination was used to demonstrate the separation of the iris from the ciliary body and a red reflex similar except in shape to the pupil, was seen.

An X-ray picture was not made, because the scleral wound was not complete and it could be seen clearly that the vitreous cavity was not penetrated; and also because the mother stated posi-

tively that she found the shot, and further because, had the shot gone into the eye, it would have been inadvisable and probably impossible to remove it. Diagnosis: Left eye, hyphemia and iridodialysis.

May 20, 1925—Detachment of iris was very small, retina entirely replaced. Vision 20/70. Patient was still under observation.

Discussion. Dr. Hilliard Wood thought the case interesting, not only as one of iridodialysis, but also of retinal detachment; and more so because the two conditions were combined. It had not been his experience that iridodialysis closes up, or that the iris reattaches itself. In his observation, once an iridiodialysis, always an iridodialysis, as likewise a pinhole iridectomy, however small, never heals. Retinal detachment sometimes reattaches, but these reattachments are not as a rule permanent. The brief examination which he was able to make of this eye showed considerable striations of the retina. He hoped Dr. Ezell would report the progress of this case some months later.

Dr. E. L. Roberts: Regarding iridodialysis, he was under the same impression as Dr. Wood, but believed that there are some exceptions. He saw a case ten years ago, in a man about 50 years of age. The tear was not an extensive one. The iris was torn loose, being separated from its attachment, in the central portion, about 1/16 to 3/32 of an inch. He told the patient that nothing could be done for the eye, but to his great surprise the man returned some months later and the condition had entirely disappeared. If he had not observed it very closely in the first place, and made a drawing he would have thought he had been mistaken in what he saw.

Dr. Ezell (closing): It was remarkable that the iridodialysis had almost disappeared. The tear was large, involving at least one-fifth of the circumference. He had been pushing atropin solution. It is impossible to account for the result in any other way, except that it healed back. Another remarkable thing about this case was that the retinal detachment has replaced itself so quickly. Fred E. Hasty, Editor.

COLLEGE OF PHYSICIANS OF PHILADELPHIA.

Section on Ophthalmology.

February 19, 1925.

Sarcoma of Iris and Ciliary Body.

Dr. Frederick Krauss presented a man aged 62 years, in whom the right iris showed a melanotic mass occupying the lower and outer angle of the anterior chamber. The tumor, except for its color and irregular contour, could be readily taken for a hyphema. There was a slight discoloration of the sclera, over the ciliary body at this point. The pupil dilates well in the superior and inner half, the lower, outer part lags under atropin, the iris being pushed forward. Vision R. 10/50; L. 16/30. Tension normal. Directly behind the lens and apparently springing from the ciliary body was a large bluish white, round mass, almost spherical in outline, with a few fine vessels passing over the surface, seen when the eye is directed to the temporal side. The rest of the media appear clear. He has a grey nerve and moderate vascular changes due to his age. After a second visit to the Episcopal Hospital clinic, the patient wandered to other eye clinics and suffered from hemorrhages in the eye, as he describes it. One week ago he returned to the clinic. He had no marked pain, but felt that his eye was gradually getting worse.

Cicatricial Ectropion, Operative Results.

Dr. William Zentmayer said that the procedure was one modified from that suggested by Imre, and consisted in the excision of a diamond shaped area including the margin of the lid and a portion of the scar. Lateral incisions were made parallel to the border of the lid from either mid-angle of the diamond, almost to the canthi. The marginal suture was inserted to deepen the cul-de-sac. The result was an absolute correction of the ectropion. The patient was a little girl who had fallen against a hook which had lacerated the lid.

Bilateral Scleritis.

Dr. P. DeLong presented a case of tubercular scleritis in a colored man,

aged 36 years. Vision O. D., 6/9; O. S., 6/15. During convalescence from an attack of pneumonia in September, 1924, the writer observed three areas of congestion in the eyes. On the right side, the area was down and out; on the left side, up and in and down and out. No other involvement of sclera. Slight infiltration at the limbus to the temporal side; no evidence of any definite cyclitis. At 11 o'clock, in the iris angle, there appeared a small pinhead sized nodule. Wassermann strongly positive; tuberculin tests negative. Physical examination, negative. Reasons for diagnosis of tubercular scleritis. (1) Disease followed a pneumonia with pleurisy; (2) Luetic and usual treatment gave no response; (3) Clinical picture suggests a tubercular process.

Discussion. Dr. William Zentmayer said that the patient of Dr. DeLong's appeared to be one of deep scleritis, but, as Fuchs says, one cannot say whether the condition is superficial, or a deep scleritis, until the infiltrate is absorbed, when the depth can be judged by the resulting thinning of the sclerotic. In spite of the plus Wassermann, he was inclined to believe with Dr. DeLong that the etiology is tuberculous. The race, the sluggish nature, and the recent involvement of the cornea are all suggestive of tuberculosis.

Epithelial Erosions of the Orbit.

Dr. Burton Chance exhibited a case of Jacob's ulcer, involving the orbital tissues of a vigorous man, which had existed for three years, without pain or much discomfort. It had invaded the outer third of the lids and extended deep into the orbit. The external muscles were eroded, and lately the cornea had become necrotic. The man had no treatment whatsoever. It is intended to apply radium with the hope of stopping the extension of the process.

Discussion. Dr. Leighton F. Appleman spoke of the remarkably good results which may follow the use of Roentgen rays in cases of epithelioma, as exemplified by a case seen in the Polyclinic Hospital on Dr. Holloway's service. This case showed extensive loss of the left maxillary region, leaving a cavity bounded above the floor of the orbit, below by the roof of the mouth, and posteriorly by the pharyngeal wall. This area had been exposed to the Roentgen rays by Dr. Pfahler; with the result that the whole cavity was covered by healthy mucous membrane and no sign of active erosion was to be seen. This patient eventually left the Hospital in apparently good condition so far as the local lesion was concerned.

Dr. George E. de Schweinitz discussed briefly the characteristics of so-called rodent, or Jacob's ulcer, namely, the relentless but slow advance of the process, years often elapsing before lesions attain any considerable size, and the absence of involvement of the neighboring lymph glands. He referred to a case reported a long time ago, in which this type of ulceration exhibited an unusual deliberation in its progress, many years, in fact; but ultimately, in spite of the trial of many methods of treatment, including operations, the patient died of exhaustion. This was before the period when radiation (X-ray and radium) were available. In another patient, also revealing extensive destruction of the tissue, radium, altho it did not check the slowly spreading ulceration, relieved the intolerable pain, which, however, is by no means always present in these cases. He believed this was the first time in this city in which radium had been used (it was a good many years ago) in a case of this character. The late Dr. John B. Shober had loaned his supply of radium for this purpose. He believed that it would be worth while to try, now that various methods of radiation had so greatly improved, their effect in the present case.

Orbital Abscess in an Infant. Evacuation Thru a Fistulous Orifice in the Bulbar Conjunctiva.

Dr. William Campbell Posey reported this case. (See report in full p. 612.)

Discussion. Dr. William Zentmayer said that in involvement of the superior maxillary sinus there sometimes results a cicatricial ectropin of the lower lid, due to a caries of the bone

and a resulting sinus. He had seen one such case with Dr. Posey, and in another he had operated by making an incision around the adherent cicatrix, allowing this tissue to remain attached to the bone, and then uniting over this the skin. Such a procedure he had been informed was unsurgical, as it may lead to a fistula, but it did not occur in his case.

First Book on Diseases of the Eye.

Dr. Burton Chance read the account of this book published on p. 638.

Model for Demonstration of Ocular Motility.

Dr. Luther C. Peter demonstrated a model, designed by Dr. Edwin B. Miller and himself, to aid the student to visualize the normal action of the ocular muscles; and to correlate the symptoms, when one or more of these muscles become paralyzed. Parts of the model are not unlike the small model of Knapp. It is, however, built on a larger scale, and an attempt has been made to maintain the relative size of the eyeballs and muscle lengths, together with the muscle planes as found in the living subject. In a mechanical device, it is not possible to accurately indicate and execute all ocular movements, but the model illustrates satisfactorily the movements of each muscle from primary to secondary position. Springs of varying strength are attached to the muscles to maintain the eyes in balance, or in position of functional rest. By detaching one of the cords, such as the superior rectus for example, to simulate a palsy, the eyeball is placed relatively as found in an ocular palsy. The eye is down and out and the vertical meridian of the cornea is rotated outward.

In order to indicate the symptoms as observed in paralysis, a head is attached, which, by means of a ball and socket joint, can be placed in its proper position; as seen so often as the patient walks into the office.

A second attachment is that of a diagram which shows the following phenomena: (1) In an approximate way, the physiologic action of each individual muscle and the tilting of the corneal meridian by each muscle from "eyes front," as in primary position. To illustrate, the right superior rectus moves the eyeball up and in, and rotates the upper corneal meridian nasalward. (2) The position and leaning to the false image. In the case of superior rectus palsies, it is up and to the nasal side (crossed diplopia), and the leaning of the false image is toward the median plane. (3) The limitation of movement. (4) The direction of shoulder tipping, when present. (5) In a modified way, the direction of the face in vertical palsies is indicated, as tho looking in the direction of the maximum vertical pull of the paralyzed muscle in health.

A third attachment records yoke or conjugate muscles of the two eyes, and the direction of their pull from "eyes front," as well as the leaning of the vertical corneal meridians under the action of these muscles. This diagram is a composite of the first one mentioned in which the chart of one eye is superimposed on the other. On the reverse side of the diagram are recorded the associated right and left hand rotations, and right and left hand elevators, and depressors.

The model is intended for teaching, and lends itself to demonstration before a large class, as it is of sufficient size to be seen at a considerable distance. We are indebted to the Lenox Instrument Company for the making of the model, and in solving the mechanical problems involved in the designing of the model.

Discussion. Dr. Edwin B. Millei said, that in devising this model it was found advantageous to arrange the dimensions in exact proportion to the normal eye globes—23 centimeters in diameter and the center of rotation exactly 10 centimeters from the retina and 13 from the cornea. The muscles are all about the same length in centimeters as the normal muscles in millimeters. The superior and inferior recti are placed at an angle of 22 degrees with the median plane while the obliques are at an angle of 39 degrees. The difficulty with the small models was that they were very fragile and could not be handled by a body of students, without constantly getting out

of order. The exact pupillary centers could not be worked out, because it would make the model too massive, and there is a slight error in the distance between the optic foramina.

Injury to Lens Detected Only by Slitlamp Observation.

MR. BASIL GRAVES gave an account of a condition in the eye of a man now aged 43, who, having practically normal vision, showed on retinoscopic examination a faint cataractous change above and temporalwards in one eye. This change, examined in the fine optical section, reveals itself as a thin plaque like zone of increased relucency, between the adult and outermost embryonic zone lines, rather nearer to the adult line. Retroillumination, and also the fact that it is visible by retinoscopy, indicates that the change is obstructive to light; it is "cataractous." Among other details the case shows two features of outstanding interest: first, this pathologic zone is situated rather central to the line of the surface of the adult nucleus, and therefore it is justifiable to assume that, if it originated beneath the capsule and migrated centralwards with growth of the cortex, its subcapsular origin must have dated from a period which preceded the subcapsular origin of the face of the adult nucleus beneath which it now lies. The adult nuclear zone line, tho it has been seen as early as the ninth or tenth year of life, in all probability usually comes into being beneath the capsule at a rather later period. Conforming to these chronologic facts this patient gives the history that at the age of ten he received a blow on this eye with an apple, on account of which he was kept in bed with a bad eye for three weeks.

The second feature of interest is that, while a great part of this pathologic accessory zone is truly obstructive to light—i. e. it shows as an opacity by slitlamp retroillumination and against the red background of the fundus reflex by retinoscopy, its lowest part is not obstructive to light and does not show by retroillumination in this manner. Hence, as shown by part of this pathologic area, it seemed possible to have a pathologically relucent zone like feature of traumatic origin which, showing by direct illumination in the optical section, is of insufficient density to show by retroillumination.

Following this observation, it occurred to the speaker whether it might be possible to find, in the lens of an eye examined some time after it had received concussion injury, a change which, while being sufficient to reveal itself as such by direct illumination in the optical section, nevertheless might fail anywhere to show itself against the fundus reflex by retinoscopy. The examination of various eyes which had been subject to concussion injury eventually resulted in the finding of this anticipated feature.

A man aged 21 years came to the writer three and a half years ago, a month after he had received a blow in the eye from a cricket ball. As the result of this blow he lost central vision owing to posttraumatic pigmentary degenerative changes at the macula. Retinoscopic and ophthalmoscopic examination now show his lens, and for that matter all his media, to be absolutely clear; but the slitlamp thin optical section shows a pathologic accessory relucency zone, situated not far beneath the anterior capsule, its exact situation being a little further behind the normal reduplication (subcapsular) line than this line is behind the anterior capsule. If successive optical sections are taken thru various parts of the anterior region of this lens, this accessory zone can be mapped out as having a definite shape and covering a relatively wide area. It should be emphasized that this feature in this case is revealed only by direct illumination in the thin optical section, and is revealed in no manner by other methods, e. g. retroillumination. Hence it is not an opacity, in the scientifically accurate sense that the term opacity should be used in ophthalmology.

In conclusion, this case shows that concussion injury to the eye can produce, tho perhaps rarely, some sort of disturbance of an unknown nature beneath the anterior lens capsule; so that, with subsequent migration by cortical growth, of that region which formerly was subcapsular, an accessory

pathologic relucency zone, visible only by direct illumination in the optical section, may at a later date be found in the deeper cortex; and both casts show that the depth of the situation of such traumatic changes within the cortex will depend on, and increase with, the interval that has elapsed since the receipt of the injury. Various drawings were shown illustrating the principles concerned.

COLORADO OPHTHALMOLOGICAL SOCIETY.

May 16, 1925.

Dr. G. H. Hopkins, Presiding.

Congenital Cataract: Intolerance to Operation.

J. J. Pattee, Pueblo, presented a young woman aged eighteen years, who had been first seen at the age of nine months, when she had a left dacryocystitis, a zone of dermatitis extending from the orbit to the ear and periodically to the shoulder, and also congenital cataract of each eye with pronounced nystagmus. The right eye had been needled three times between the fifth and eighth years, without any untoward reaction, but without improvement in vision. The child had entered the state school for the blind at the age of eight years. Shortly before entering the school, she made an uneventful recovery from a successful vaccination.

At the age of nine years, some iris tissue and a portion of dense capsule centrally located had been excised. Eight months after this operation, after a second vaccination, the vision of the right eye was lost from acute iridocyclitis. In 1924 the left eye had been needled at the Colorado General Hospital, and the eye had for some time seemed to do well, altho a month after operation there was still some reaction. This reaction had since become more severe, and was now accompanied by pain and discoloration of the iris. A Wassermann blood test was negative.

Discussion. W. H. Crisp, Denver, suggested a more frequent use of atropin.

J. M. Shields, Denver, would use sterile milk intramuscularly.

D. H. O'Rourke, Denver, referred to a recent case of fulminating gonorrheal ophthalmia, which had responded promptly to milk injection.

W. A. Sedwick, Denver, would give mercury freely.

Jas. M. Lamme, Walsenburg, mentioned a case of iritis; which, after being under observation for three or four weeks, cleared up rapidly after injection of fibrinogen.

F. E. Wallace, Pueblo, referred to a government publication in which it was stated, that the more bacteria there were in the milk before sterilization the better the result.

Conical Cornea, Alleged Traumatism.

J. J. Pattee, Pueblo, presented a mine worker, who had come on account of defective vision of the left eye, which he attributed to coal slack having been kicked into the eye by a mule. There had been some swelling of the eyelids and the surrounding skin. Some double vision was complained of, with the affected eye. The vision of the right eye was 20/20, that of the left 20/120. There was appreciable conicity of the left cornea. With the ophthalmoscope or retinoscope there was very striking confusion of the reflex, with a rapidly shifting shadow which simulated an opacity. The man's belief that his loss of vision was due to the injury appeared to be honest; but there was now no evidence of injury, and apparently no causal relationship existed between the injury and the impairment of vision. Industrial compensation was claimed.

Discussion. H. M. Thompson, Los Angeles, (by invitation) discussed the influence of internal secretory disturbances, and also of focal infections, in these cases. He referred to a patient in whom removal of a third molar tooth, which had a fistula, was followed by marked improvement of general condition and incidental benefit to the eyes.

Retinitis Pigmentosa.

J. W. Thompson, Pueblo, presented a man aged thirty-eight years, who had come with a record of defective vision from early childhood, worse at night, and also a defect of hearing and speech. The general health had always been

good. The general findings were negative, particularly the Wassermann test. The corrected vision was 20/60 for either eye. Ophthalmoscopic examination showed in the right eye a small posterior polar cataract, many floating vitreous opacities, indistinct disc margins, small bloodvessels; and the characteristic pigment deposits of retinitis pigmentosa, extending from near the periphery almost to the disc. The findings in the left eye were similar.

Discussion. W. H. CRISP, Denver, referred to a family of which he had recently seen two members, and in which three children had congenital deafness, and developed night blindness during adolescence.

Retinal Hemorrhage from Hypertension.

F. E. WALLACE, Pueblo, presented a man aged forty-six years who since February had noticed smoky vision of the left eye and later of the right. The condition had been intermittent, the attacks being accompanied by headaches and also some disturbance of sensation in the fingers and lips, with thickness of speech and a feeling of "queerness." The blood pressure was 250 millimeters, and urinalysis showed albumin. The vision was right 20/35, left 20/180. In each fundus there were numerous recent hemorrhages, and whitish areas representing the sites of former hemorrhages.

Discussion. J. M. SHIELDS, Denver, suggested that the teeth should be taken care of.

W. H. CRISP, Denver, thought that specific treatment might prove desirable, in view of the general appearance of the case, including a plethoric habit of body.

C. E. WALKER, Denver, would not put the man on specific treatment while there was albumin in the urine, unless the blood Wassermann was positive.

Concussion Cataract.

F. E. WALLACE, Pueblo, presented a girl aged four years, whose parents had noticed something wrong with the left eye since the age of eight months. The pupil had gradually become whiter. At the age of about seven months the child had had two falls, in the second of which she had struck her left forehead against a sharp piece of furniture, altho without apparent injury to the eye at the time. For the past eighteen months the child had been on a preparation of calcium iodid, and absorption had been gradually taking place, so that there was now a good sized crater in the center of the opacity, while a crescent shaped opacity persisted in the upper and outer part of the anterior lens substance.

Discussion. W. H. CRISP, Denver, suggested that a part at least of the clearing might have been due to the formation of new lens substance; and that the tendency to develop new lens substance in early life was often a reason for postponing a needling operation in such cases.

W. A. SEDWICK, Denver, suggested that there might have been an injury to the capsule, and subsequent absorption of the opacity.

Optic Atrophy, Hemianopsia.

O. C. WISE, Pueblo, (by invitation) presented a man aged thirty-four years who in 1921 had been exposed, in the course of his work, to a great deal of gas from the exhausts of automobile tractors, and who, after severe headaches, had noted loss of vision in the right eye. The patient had worked since that time on a farm, by the advice of a physician, and his vision remained constant until he returned to his former occupation, when the vision again fell off. He had been subject to attacks of nausea and dizziness, on riding appreciable distances in a closed car. In March, 1924, he had noticed loss of vision in the left eye. For the past year or more the right eye had been without light perception, and the vision of the left eye had remained steadily at 5/200. The tonsils had been removed, and various tests, including the Wassermann, were negative.

Discussion. H. M. THOMPSON, Los Angeles, (by invitation) had seen this man some years ago, and emphasized his sensitiveness to poisoning from the exhaust fumes of the automobile.

F. E. PEIRCE, Pueblo, (by invitation) discussing the X-ray plates, suggested

that the man was of the eunuchoid type, with probable hypopituitarism, the distance between the clinoid processes being unusually great.

Dr. H. M. Thompson said that there was a sharply defined hemianopsia in the left eye.

W. H. Crisp, Denver, suggested that this feature would tend to rule out a carbon monoxid etiology.

G. L. Strader, Cheyenne, Wyoming, referred to the case of a truck driver, who had had headaches after long drives in a closed truck the exhaust pipe of which had been found leaky, and who had finally become totally blind.

Retinochoroiditis. General Neurofibromatosis.

G. H. Hopkins, Pueblo, presented a boy aged twelve years, who had come complaining of falling off in the vision of the right eye in the course of the past two years. The vision had been getting steadily worse since March, 1924. There was an old retinochoroiditis extending from the extreme temporal part of the right fundus almost into the macula, and the vitreous contained numerous floaters. The patient was underweight, and there were numerous irregularly distributed, hard, small tumors beneath the skin all over the body. One of these tumors had been excised, and the pathologist had reported it to be a neurofibroma. Other tests and examinations were negative, including an X-ray examination of the chest for tuberculosis.

Discussion. James Lamme, Walsenburg. There seems to be a disturbance of the choroid at the macula, as well as in other regions. What is the boy's mental condition?

Dr. Hopkins replied that the patient was not retarded in his school work.

Wm. H. Crisp, Secretary.

MINNESOTA ACADEMY OF OPHTHALMOLOGY.

May 8, 1925.

Dr. John S. Macnie, Presiding.

Retinal Hemorrhage. Vitreous Opacities.

Dr. Paul Berrisford (St. Paul) presented the case of Mr. T. G., age 23, employed at the National Lead Battery Company. Family history negative. As far as the patient knows, his present trouble began last June. At this time his vision in the right eye became cloudy, so much so that he was unable to see large objects. The sight gradually improved over a period of a month, at the end of which time he regained reading eyesight altho he was troubled with black specks floating before his vision. His vision then remained good for a month when one night when reading all became cloudy before the right eye and everything had a yellowish cast.

The condition remained the same for about 3 months, after which time the condition in the right eye gradually improved over a period of 3 weeks when he could see pretty well. Then suddenly the right eye again became cloudy, the vision in it becoming more obscure over a period of 5 minutes. The condition has remained about the same up to the present time, only outlines of objects being seen. He does not believe that there is anything particularly wrong with the left eye altho he states that for the past 3 or 4 years he has not been able to see distinctly at a distance with it.

Examination: Wassermann (blood) negative. Chest negative. No general, focal or local reaction from ½ mg. of old tuberculin. (Higher doses will be given later.) Ears, nose and throat negative. Vision in the right eye, counts fingers at 10 ft.; left eye, counts fingers at 18 ft. Divergent strabismus present fixing with eye. Right eye shows a few cortical radiating striae in the periphery of the lens; thruout the vitreous are many fine opacities and coarse ones; from the nervehead is a fan shaped organized membrane, the core of which appears dirty white and contains new blood vessels, while the periphery spreads out in a blackish web towards the lens. The distal extremity of this tissue is best seen with a plus 16 lens. Only a red reflex can be seen from the remaining portion of the fundus.

The left eye shows no abnormality in the lens or vitreous, altho the optic nervehead appears indistinct as thru

a haze. About a disc diameter from the disc, upward and temporally, is a large area of retinal exudation, the outer portion of which is bordered with hemorrhage. About a half disc diameter from it upward and temporally is a bunch of dirty white exudate, perhaps ⅔ the size of the disc, being elevated from the surrounding fundus. From it extends an epaulet of new formed vessels that take a temporal direction in a brush like manner. Above this in the near vicinity is a good sized hemorrhage. These are the gross lesions, altho fair sized hemorrhages are seen in the retina everywhere.

Hole in the Macula.

Dr. Paul Berrisford (St. Paul) presented two cases, one of inflammatory and one of traumatic origin.

1. Mr. L. K., age 35, colored, appeared at the Wilder Dispensary because of poor vision in the left eye. entire history was negative, excepting that in 1908, while in St. Louis employed as a mechanic, he was struck in the left eye with flying particles of steel. He was working with a lathe at the time. He claims that this steel was removed by means of a magnet, a particle having lodged within the eyeball. The only pathologic findings that can be demonstrated are the changes evident in the macular region of the left eye.

The left eye shows a kidney shaped excavation in the macular region whose concavity is directed temporally and whose long diameter is about that of the disc. In appearance it is a mottled grayish white, not unlike the markings of the lamina cribrosa seen ophthalmoscopically, altho the mottling is coarser. By the phenomenon, parallactic displacement, the area is seen to have depth but hardly measurable. Bridging across the depression is an almost transparent veil giving the hole a screened appearance, no doubt a remnant of the degenerated retina. Surrounding the concavity is a halo of dense, black pigmentation with a sharp cut outer border, and about ⅓ disc diameter in breadth. In the region of the concavity of the kidney shaped depression, the pigmentation is more irregular and rather patchy.

Vision in the right eye is 20/20; in the left eye 20/100—. The macular hole is, in this instance, of an inflammatory origin and is, up to date, of unknown etiology.

2. Mrs. L. E., age 30, colored, appeared at the Wilder Dispensary for the purpose of obtaining glasses. On February 13th, 1925, she was struck in the right eye by a fist with a resulting discoloration of both eyes. Up to the time of her assault her right eye was the better seeing eye. Since that time she has been unable to read with it. Vision in the right eye 20/100—, in the left eye 20/65. Retinoscopy under a mydriatic shows the right eye to be emmetropic, left eye irregular corneal astigmatism. The left eye is entirely negative excepting for a central corneal opacity for which the patient can not give an explanation.

The right eye is also negative excepting for the macular change. Exactly in the macula is a punched-out round hole about ⅓ disc diameter in size, dark red in color and granularly pigmented, as if sprinkled with emery powder. It is slightly below the surrounding fundus in level. Completely surrounding the hole is a halo of homogeneous pigmentation about half the diameter of the hole in breadth and with a sharp outer border.

Discussion. Dr. Lewis stated that these two cases of Dr. Berrisford are interesting to him and show how hard it may be to make a diagnosis of a hole in the macula. In one of the cases the hole is not in the exact center of the macula but a little distance from it. Parallactic movement is easy to get in this case, as the different depths are considerable and the hole is easy to determine. In the other case the hole is right at the fovea and at that position the retina is so tightly adherent to the structures below that parallactic movement is harder to get.

Ulcer of Cornea Following Smallpox.

Dr. E. R. Bray (St. Paul) presented Mrs. G., age 27. History of smallpox 6 weeks ago, followed 2 weeks later by ulcer on right cornea. The infection is

still active in the cornea, and the last 2 days she has had a small hypopyon. We have used typhoid vaccine twice and milk injections twice. There seemed to be a slight improvement, following each of these treatments, but for only 2 or 3 days. There is at present a steady ache in the eye, and even the weight of the upper lid causes pain, especially when she is lying down. Aspirin at night seems to give her sufficient relief so that she can sleep for a few hours.

The question of using a Kuhnt's flap over the entire cornea might be advisable. He would be glad to hear some discussion on this method of treatment, or any other method that may be recommended. The patient is using atropin, argyrol, and hot applications every 3 hours, and dionin once a day.

Discussion. DR. J. C. BROWN said he would like to ask for information. He had a case of ulcer of the cornea following smallpox and the ulcer cleared up all right, but there is considerable opacity within the eye and Dr. Brown had never been able to see the background at all. He was wondering what the possibilities of abscess are in these cases, and asked if any of the members knew of abscess occurring in the deep layer following smallpox. He stated that all the cases he had had, prior to this one, got well but this one is not getting along very well. The case is complicated by a phlebitis in the leg.

DR. BERRISFORD stated, that in Dr. Eduard Boeckmann's practice he had seen several cases of corneal affection the result of smallpox, most of which were of the deeply infiltrating ulcerative type, very refractory to treatment and with a protracted course ending usually with an opaque cornea. Dr. Bray's, altho ulcerative, shows an infiltration disciform in contour. Having used foreign protein in the form of typhoid vaccine and milk, Dr. Berrisford feels that subconjunctival injections or a conjunctival flap preceded by curettage might be tried.

DR. F. J. PRATT suggested giving intravenous injections of sodium salicylat, 20 grs., once or twice a day. He stated that he noticed the ciliary body was swollen.

DR. GRANT suggested that if repeated paracentesis of the anterior chamber was practiced some benefit might be obtained, especially if this was continued over a long period of time at frequent intervals, perhaps every other day. He thought that in this way Dr. Bray could increase the number of leucocytes in the anterior chamber and also those circulating in the cornea; and that improvement might be more rapid.

DR. ROTHSCHILD asked, if any of the members had used injections of diphtheria antitoxin. He stated that Dr. Knapp, in New York, has been using it frequently, and had reported a number of cases in which he had obtained good results.

DR. BRAY stated, that the eye seems to have very poor resistance. The inflammation continues in the cornea no matter what is done. He said he was afraid to use milk injection again on account of danger of anaphylaxis. He expects to use subconjunctival injection of salt solution to try to clear the hypopyon.

Follicular Conjunctivitis.

DR. J. F. FULTON (St. Paul) presented the case of a boy, W. Q., 10 years of age. Mother, an Indian, 30 years of age, with chronic trachoma, which she acquired when 15 years of age. She is now suffering with a relapse of this disease, with all its characteristic symptoms, for which the writer is treating her. The diagnosis in the boy's case, however, is that of follicular conjunctivitis, on account of the follicles being arranged in rows, much more prominent than trachoma follicles, pale and translucent, on both palpebral and bulbar surfaces. In this case the following hypertrophy is quite extensive on the bulbar surface of both eyes, which is unusual. Altho this case somewhat resembles tuberculous and vernal conjunctivitis, the clinical history eliminates the possibility of its being either.

Dr. Fulton stated that he had no hesitation in pronouncing this a case of adenoid of the conjunctiva. The patient has already had a growth of a similar nature removed from the posterior nares. There have been no corneal complications. There has been

an almost complete absence of inflammatory symptoms such as one finds in typical trachoma. In addition to that, the symptoms are yielding rapidly to mild astringents and antiseptics. A younger brother has recently had an attack of the same disease which yielded promptly to mild local treatment.

Discussion. DR. LEWIS thought the comparative absence of much pathology in the upper lid and the hyperplasia in the lower lid would point more to follicular conjunctivitis. Raising the question as to whether or not this might be a vernal catarrh, he stated that a diagnosis of vernal catarrh without having daylight would be rather risky.

Sudden Loss of Vision.

DR. H. H. LEAVITT (Minneapolis) presented the case of N. K., age 53, a Greek, occupation a fruit and vegetable dealer, who consulted him the day before complaining of sudden loss of vision of the left eye. Patient states that he was at the market Saturday, April 18, purchasing fruit and vegetables, when he noticed a cloud over his vision. He put his hand over his right eye and found that he could see nothing at all with the left; all was darkness. He worked the rest of the day. He stayed at home Sunday and worked again Monday. On Tuesday, the eye being no better, he consulted a physician. He saw Dr. Aune and Dr. Baker during the next 2 weeks. Dr. Baker then referred him to the writer.

Patient is a heavy-set man, of medium height, weight 200 pounds, and healthy looking. On examination, both eyes appear normal externally. The pupils are large. The right one reacts slowly to light; the left does not react. The tension is normal in both. The cornea is clear and the conjunctiva free from congestion or inflammation. The ophthalmoscope reveals a transparent lens, a pale disc, small pale arteries, and moderate sized veins. The arteries grow quite faint if moderate pressure is made on the eyeball.

Rhinologic examination is negative. The tonsils are hypertrophied, reddened and generally unhealthy looking. Transillumination is normal and is alike on both sides. X-ray shows a small frontal sinus on the left side; otherwise negative. Sella normal. Urinalysis is negative. Sp. Gr. 1018; no sugar or albumin. Blood examination: Hb. 60%; white blood cells 6,900; red blood cells 4,320,000. Wassermann +. Kolmer negative. Blood pressure 133/110. Patient has had quite severe pain over the left eye at times for the last 20 years, none now. He had an operation for rectal fistula a year ago, since which time he cannot tolerate tobacco. Drinks wine at home but never takes a drink anywhere else.

Arteriosclerotic Retinitis.

DR. PAUL BERRISFORD (St. Paul) read a paper on this subject.

Discussion. DR. GRANT stated, that when he read the article written by R. Foster Moore, he was surprised that loss of vision was described as entirely due to the atrophy resulting from arteriosclerosis of the retina, failing to mention any arteriosclerosis which was present in the optic nerve or chiasm from arteriosclerosis of the vessels supplying these areas. It is interesting to note that in attempting to follow the course of the optic nerve fibers thru the chiasm many failures have been reported because of arteriosclerosis. Of the several attempts that have been made to follow these fibers thru the chiasm only 2 have been completed. In all other cases in which the procedure has been attempted, there has been so much sclerosis of the vessels that it has been impossible to follow the fibers thru.

DR. SCHWARTZ said, he would like to add a few remarks to what Dr. Berrisford has said. (1) As Dr. Berrisford mentioned, one of the first signs of change in the arterial wall, and also of hypertension, is compression of the veins by overlying arteries. When these points of compression occur in several places along the same vein, they produce ampulliform dilatations. (2) Arteries, especially in later stages, are very often very narrow and quite straight instead of being tortuous. He had jotted down a remark with regard to the apparent variation in the calibre of the arteries when Dr. Berrisford came to the discussion of edema of the retina.

In a few cases of apparent change in the arterial calibre cases which had been pointed out to him by internists, who are becoming skilful in finding fundus changes in kidney and vascular disease—in some of these cases he has had to disagree, because he did not think there was definite variation in the calibre of the arteries, but rather a difference in the plane in which the artery lay at various points in its course. He had come to this conclusion in some cases from 2 things: (1) Most of the retinal landmarks were more or less diffuse or obliterated. (2) No other signs of change in the vessels were seen. These examinations were made, of course, with the pupils well dilated.

He would bring up one other point, i.e., that white spots in the retina are not always atrophic spots or simple exudate. They may be fatty degeneration of the various retinal elements, or of the exudate itself. Dr. Schwartz felt that it was going to be a very difficult task to differentiate between the white spots of chronic interstitial nephritis and those of chronic glomerular nephritis, and stated that many good internists have discarded the idea that there is such a thing as chronic interstitial nephritis.

DR. BERRISFORD said the general impression obtains that hemorrhages in arteriosclerotic retinitis are due to hyperpiesis. Foster Moore believes, and with good reason, that such is not the case; in fact the blood pressure within the sclerotic retinal vessels may actually be reduced. In Moore's opinion, hemorrhages of the character described are in all probability the result of blood changes together with changes in the vessel wall.

Another phenomenon commonly associated with retinal arteriosclerosis is the socalled "venous banking;" that is, where a sclerosed artery crosses a vein there is a dilatation and sometimes increased tortuosity of the vein in its distal portion, owing to the impairment of venous flow. In Moore's experience this is seldom seen. However, where a sclerosed artery crosses a vein twice, in the entrapped section of the vein, reduction in the size of the blood stream may be encountered.

In regard to the white spots which are associated with arteriosclerotic retinitis, their appearance is quite unlike the snow bank, cotton wool patches which are commonly associated with renal retinitis of parenchymatous nephritis and the mackerel back areas of chronic interstitial nephritis. They are tiny spots, dots or areas, with a tendency to group formation, whitish in color, discrete in outline, and neither bordered by pigment nor hemorrhage. They may disappear without leaving a trace, fading away in toto.

Slit Lamp Obersvations of the Cataractous Lens.

DR. L. W. MORSMAN (Minneapolis) gave a talk on this subject, illustrated with slides.

Discussion. DR. BERRISFORD complimented Dr. Morsman on his most careful research and instructive talk. He asked Dr. Morsman if, by the slit lamp alone, he could determine and classify the cataract under observation, and if from a practical standpoint the slit lamp gave us any added information other than that obtained by our methods of observation.

DR. MORSMAN said that it was a great aid in determining the type of cataract and called attention to the drawings shown of the embryologic types. He said that of course a man who had had a large experience in ophthalmology could determine the type of cataract by other means, but it is so much easier with the opacities right before your eyes. If one finds they are limited by the embryonic sutures it is of embryonic origin. The type that follows normal suture lines is likely to be senile, while opacities in all directions indicate toxic cataract.

Of course all of these findings must be combined with the history. In the toxic type the history and the rest of the examination would have to tell one just what kind of toxic cataract it was. He said one finds cases where a number of types are combined. Of course it might not always be possible to say that the opacities were of a certain type; but one could make the microscopic findings a part of the entire picture of the case. He stated that one

could dispense with this procedure entirely from a practical standpoint, and any man who has not a slit lamp need not think that he is neglecting his patients. His treatment of the case is usually not modified by any additional knowledge he gets from the use of the slit lamp microscope.

Dr. Morsman stated that there is a tremendous amount of literature on this subject; there are 3 books in German—one translation in English—and Graves has one which is coming off the press soon. There are a hundred monographs on this subject, which is supposed to be new; however, one author repeats what the one before him had said. He had found references in most every country in Europe and also in America, and most of them were a summing up of the situation by men who had taken postgraduate work and wanted to tell what they had seen and learned, and that one had to read a tremendous amount of literature to be sure he did not miss anything. Dr. Morsman thought, however, that if one read Graves and Vogt, and then looked over the American authors one would have practically the whole subject.

He stated, on the other hand, that he was glad he had invested $550 in the outfit; that he was going to use it in his office as it made one feel quite at home with a case in which he could watch the changing pathology. He thought, however, that it would be difficult to try to learn the use of this apparatus on private patients as the patient gets very tired and restless and a private patient might not come back. He felt that the best way was, if possible, to become familiar with its use on clinical material as he had done at the University.

Dr. Macnie stated, as Dr. Morsman had said, that there is a vast difference in using the slit lamp on private patients and on clinical material. He wished to call attention to one feature of its use, and that was the exact localization of small foreign bodies. One can get them with the slit lamp when they cannot be located with the ophthalmoscope.

W. E. Camp, M.D., Secretary.

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DIONIN FOR CORNEAL OPACITY.

Dionin is often prescribed for corneal opacity, and probably has as much value in reducing clouding of the cornea following inflammation as any other drug; but, like other drugs it can do harm as well as good. Its harmful effect has been observed clinically and the reasons for it are not hard to understand. A brief statement of the writer's understanding of how it should and should not be used may not be out of place.

The parenchyma of the cornea consists of a slight modification of white connective tissue. After corneal ulceration its repair is thru the development of connective tissue from fibroblasts. This scar tissue is at first opaque, like white connective tissue in general. Slowly it becomes less opaque and approaches transparency. The change is at first rapid, gradually slower and finally ceases. In parenchymatous keratitis, exudates and new formed tissue in the cornea are at first more or less opaque and then gradually approach transparency. The usefulness of dionin in this connection is to help the change toward transparency to be as rapid and complete as possible.

Both the process of inflammation and the process of diminishing the resulting opacity are attended with hyperemia. The usefulness of dionin in this connection seems to be associated with its power of producing hyperemia. The material which causes corneal opacity is both brought to the cornea and is also removed from it by the blood thru which the cornea is nourished. Normal nutrition involves a balance of material supplied and material removed: and that the material shall be supplied slowly enough to undergo complete elaboration to conform to the tissue characters including clearness. The supply of tissue too rapidly for such complete elaboration favors opacity rather than transparency.

The role of dionin in the treatment of corneal opacity is to quicken the local circulation for the time being; not because it is advantageous to have

new material added to the cornea, but in the hope that the subsequent removal of material as the return to normal is accomplished will remove exudates and favor the clearing up of the new formed cells. It is extremely important that this later part of the process should be allowed to complete itself, and not be interrupted by fresh edema produced by another application. Dionin should not be used too frequently. The writer believes that repetition of the application once in four to ten days is often enough to secure the best results in the direction of corneal transparency.

It is probably important also that, during the period immediately following the hyperemia production by dionin, the general emunctories of the body be kept active. The bowels should be loose, and free excretion by skin and kidneys favored by active exexercise and free drinking of water. There is need for more exact knowledge of what general conditions favor or oppose local elimination. The biomicroscopy of corneal healing offers a very attractive field for exact observation and study. Clinical experience shows that injudicious use of dionin can increase corneal opacities or prevent their regression. Minute and experimental research is needed to render our knowledge of local and general influences that modify tissue repair more complete and accurate. The clearing of new formed corneal cells seems to be necessarily a slow process, and injudicious interference with it may prevent rather than hasten it.

E. J.

OPHTHALMOLOGY FOR THE MEDICAL STUDENT.

Arising in the mists of antiquity the art of medicine grew slowly thru the years, nurtured by such men as Hippocrates, Galen and Vesalius. The nineteenth century witnessed a rapid development, and specialties began to appear. Among the first was ophthalmology. Quickly more and more branches arose, and larger and larger grew each branch.

There was a time when a good knowledge of as much medicine as was then known could be obtained in two years; but soon the period lengthened to three and then four years, with a fifth now becoming almost a necessity. Today the known facts of medicine and surgery, excluding the specialties, are so voluminous that to fairly cover these alone leaves only from forty to sixty hours for each special branch.

As it is impractical to increase the four years of medical school, the problem confronting the ophthalmologic departments of these schools is how best to utilize the few allotted hours.

Specialists obviously cannot be made in this brief period. Even the commonest diseases can be little more than mentioned, but one thing can be done—and a very important thing not only for the student but for ophthalmology—and that is to instill a good idea of the relation of this specialty to general medicine. The ophthalmologic findings in various diseases with the diagnostic and prognostic value can be indicated. The student should be taught the use of the ophthalmoscope and trained to employ it in every complete physical examination, learning to realize what a valuable aid in diagnosis of general disease is this discovery of Helmholtz.

The student may be taught to observe the choked disc of brain tumor, the optic atrophy of tabes, the retinitis of nephritis, the cataract of diabetes and the multiform pictures of arteriosclerosis. The constriction of the fields in various cerebral conditions and in hysteria, the scotomata in toxemias and eye signs in Graves disease can be demonstrated. Where can the pathology of inflammation be studied better than in the eye, and what a valuable help in the localization of diseases of the nervous system is the reaction of the pupil.

Impressing the interdependence of general medicine and ophthalmology will tend to prevent the isolation of the specialty and that is necessary for the

best interest of ophthalmology. The branch cannot live without the tree. Let us recognize the connection and be impressed with its great importance. Keep the ophthalmic hospital closely associated with the general hospital; and teach the student ophthalmology, not only in the specialty clinic, but also—and more important—in the wards of the general hospital.

L. T. P.

OCULAR LESIONS OF ONCHOCEROSIS.

On the Pacific watershed of Central America, particularly in Guatemala and extending northward into Mexico, this disease is endemic thru a region lying from 600 to 2,000 meters above sea level. Prof. Fuelleborn of Hamburg, Germany, who visited this region in connection with the International Conference on Health Problems in Tropical America, last year, studied it for a few days on a plantation where 70 per cent of the Indian laborers were "carriers" of the Onchocerca. In his paper before the Congress he called it the "blinding filaria"; and endorsed the view that it was a species distinct from *Onchocerca volvulus* of Africa; because the tumors formed by the adult filaria were mostly in the scalp, whereas those of the African species were found in the scalp in only 1 per cent of cases. He adopts for the American species the name *Onchocerca cæcutienus*, given by Brumpt, altho he agrees with that author that morphologically the two forms are indistinguishable.

The ocular symptoms and lesions of onchocercosis were brought to the attention of ophthalmologists by Robes in 1915 and especially by the articles in this journal of Pacheco-Luna (1819, p. 122 and 1919, p. 793) and Molina Isquierdo (1919, p. 274). These include especially, dryness of the conjunctiva, smarting pain, intense photophobia, contracted pupil and impaired vision. Later the cornea presents dots of white infiltration, invading it from the periphery and chiefly in the part exposed in the palpebral fissure. Finally a chronic, insidious fibrinous iritis sets in, the pupil is displaced and the eyes become practically blind, apart from any clouding of the media. Removal of the filarial tumors arrests the eye symptoms, and if done early restores the eyes to normal.

Some cases of onchocercosis travel into other regions and other countries, seeking relief; so that some acquaintance with this pathologic condition may be useful to any ophthalmologist. The essential nature of onchocercosis is also of interest, and from it a better understanding of ocular pathology in general may be obtained. The sudden improvement in the early eye symptoms, following removal of the filarial tumors, is so striking as to suggest the influence of some toxic substance, supplied from the tumor and effecting unfavorably the tissues of the eye. In the blood, ova are generally lacking and microfilaria are not numerous. But Fuelleborn was able to demonstrate the microfilaria in greatest abundance in pieces of skin, taken from the ear and scalp of an onchocerca carrier. He thinks it would be interesting to ascertain whether the microfilaria also accumulate in the tissues of the eye.

The experience thus far recorded shows that removal of all the filarial tumors is the effective remedy for onchocercosis. Pacheco Luna found that the eye lesions yielded to no other treatment. He tried injections of various agents, locally in the eye, intravenously and into the tumor itself; but found them ineffective. Fuelleborn also tried injecting cocain into the tumors in two cases. Examination of the excised nodes by his pupil Dr. Zschuke, 3 or 4 weeks later, showed the microfilaria in one dead, but in the other alive. Intravenous injections of stibenyl and tartar emetic, and subsequent excision of the tumors showed the microfilaria still alive. The eye lesions of onchocercocis in the cornea and iris are favorably situated for examination, and iris tissue has been removed by iridectomy for the results of chronic iritis. The careful microscopic examination of such tissues ought to yield important facts regarding this disease, and suggestions that may be of wider application.

E. J.

BOOK NOTICES.

Slit Lamp Microscopy of the Living Eye. Dr. F. Ed. Koby. Late first Assistant of the Ophthalmic Clinic, Basle. Translated by Charles Goulden, O.B.E., F.R.C.S., Surgeon; and Clara Lomas Harris, M.B., Chief Clinical Assistant, Royal London Ophthalmic Hospital. Cloth, octavo, 238 pp., 43 illustrations. Philadelphia, P. Blakiston Son and Co., 1925.

The interest in the new chapter of ophthalmology, opened by the slitlamp of Gullstrand, steadily increases. Its literature is no longer a single book—it becomes a library. This book is put forward as a summary of microscopy of the living eye. Its subtitle is "Early Diagnosis and Symptomatology of Affections of the Anterior Segment of the Eye." The author says, "I wished this Summary to be a faithful account of actual observations, and I have only set down, without reference, what I have been in a position to verify with my own eyes." The author modestly concludes his introduction thus, "It need hardly be said that this work will only make profitable reading to those already *au courant* with ordinary ophthalmology, and that it will not supplant any of the excellent handbooks of ophthalmology in which French literature is so rich. Neither does my Summary replace Vogt's fine Atlas, but rather condenses and completes it. I cannot even claim, in the popular phrase, to 'fill the gap' (tho a gap seems certainly to exist), but only to show the beginner in ocular microscopy something of what is, and also to prevent him from seeing that which is not."

However, we believe the translator's preface gives a more just estimate of the place of this work when it states, "There are few textbooks on the subject in any language, and in none has the author set out so clearly the methods of use and fields of application of the slitlamp." This preface also serves a real need in giving the German, French and English equivalents used to designate certain appearances revealed by this method of examination; which are new and therefore render necessary a new terminology. To have them thus grouped will assist in keeping clear the fundamental ideas and emphasizing the basic appearances on which one's knowledge of biomicroscopy of the eye is to be built up.

The body of the work is divided into 9 chapters, headed as follows: I Apparatus. II Methods of Examination. III Phenomena of the Reflection of Light by the Ocular Media. IV The Conjunctiva. V The Cornea. VI The Anterior Chamber. VII The Iris. VIII The Crystalline Lens. IX The Vitreous Body. The examination of the fundus of the eye with focal illumination is considered in a single paragraph and dismissed with the judgment: "The clinical benefit we have obtained up to now has remained so very modest." The opinion is expressed regarding this and gonioscopy; "it is anticipated that their methods will never be used in current practice." Among the essentials required for the former is: "above all, a very willing subject with patience for any ordeal."

It may be seen from what it omits, as from what it gives, this is a thoroly practical treatise. The beginner, sitting down with the apparatus and this book before him, will be able to enter profitably upon a course of self training, that will carry him into a knowledge of the subject, where most interesting observations can be made on any eye, and practical information as to clinical cases will be obtained. He will progress faster and go farther with the help of a skilled teacher; but, without that aid, any ophthalmologist may feel that the door is widely opened to this new and important domain of clinical information.

The illustrations of the work are all prepared by the author and so have a close and vital connection with the train of thought set forth thru the text About one-third of them are reproductions of actual photographs of the appearances produced by the slitlamp illumination of the eye. They are very simple, give more closely the exact appearances seen with the instrument and therefore account will be more helpful to the beginner, in the clinical manipulation of the instrument and interpreta-

tion of what is seen, than will the larger collection of pictures in Vogt's Atlas. The two books supplement each other, but this one is the better to begin with. How closely this translation renders the wording of the French text could only be known by minute comparison of the two. But there can be no question as to its interpretation of the thought that text was intended to convey.

The bibliography of a subject so rapidly developing as biomicroscopy will necessarily be incomplete, and not quite up to the date of publication; but this one of 12 pages, over 300 references, illustrates the vastness of the literature already extant on this subject. The bibliography is massed at the end of the book. But the papers referred to in it are grouped in close correspondence to the chapters into which the book is divided. This adds much to the convenience of using it. There is a good table of contents and an excellent alphabetic index. Primarily this is a textbook to be carefully studied from beginning to end. But it is also an excellent book of reference, to follow out the particular line of thought, or gather the exact information in which the reader is interested. E. J.

Affections de l'Oeil en Médicine Générale, Diagnostic et Traitment. F. Terrien et G. Cousin. Paper, 8vo., 518 pages, 128 illustrations in the text. Paris, Masson and Co., 1924.

This is a book that brings to the medical profession generally, some ocular lesions and symptoms that have important relations with general diseases, or with local diseases outside the orbit. What might be regarded as introductory matter takes up certain points of anatomy of the eye and related parts; and general statements regarding the physiology of the eye—visual, nutritive, motor and secretory functions. The body of the book is divided into three parts: First, Generalities, and the examination of functional troubles of the eye. Second, The examination of symptoms of the eye and its appendages. Third, Ocular troubles in general diseases. There is also an appendix, describing methods of examination that may be applied in ophthalmology. There is an excellent table of contents and a complete alphabetic index.

There are a great many facts relating to ophthalmology and its relations to general conditions brought together in this volume, systematically arranged and set forth in clear, well chosen language. It is a work that any practitioner, of any branch of medicine or surgery, can turn to with confidence that the leading things, known of the relations between ophthalmic lesions and symptoms, and the related conditions that claim the attention of other specialists, can here be readily referred to and authoritative information obtained regarding them. It is not burdened with the names of authors who should be credited with what has now become the common heritage of the medical profession, and the references given seem all to be to the French literature; which is, of course, presumably most accessible to French readers.

One who reads much of current literature, or even what has been gathered from it into the Yearbook, will be struck with the absence of reference to some topics that have awakened general interest in the last few years; such as lipemia retinalis in diabetes (insulin of course is not mentioned), tower skull, onchocercosis and blastomycosis. The relations of dental conditions and those of the tonsils and pharynx, to visual and ocular disturbances, are treated in less than a page. The chapter on affections of the nervous system, 55 pages, is one of the best in the book. In the more than four pages devoted to lethargic encephalitis, is about the best account of its ocular symptoms and lesions to be found in any standard book of reference.

This must be ranked as a valuable book of reference, and one which the student or young practitioner can read systematically with advantage. It is devoted far more to diagnosis than to treatment; but wise treatment rests on exact diagnosis. E. J.

International Conference on Health Problems in Tropical America. Held at Kingston, Jamaica, July 22 to August 1, 1924. Cloth, 8vo., 1,042 pages. Illustrated. Published by United Fruit Co., Boston, Mass., 1924.

United Fruit Company, Medical Department. Thirteenth Annual Report. William E. Deeks, M.D., General Manager. Paper, quarto, 248 pages, illustrated. Boston, 1924, United Fruit Co.

The United Fruit Company, besides maintaining steamship service from 7 ports in the United States, on 24 routes, to its 10 tropical business colonies, maintains fully equipped hospitals in Boston, New York and New Orleans and in each of its tropical divisions. The personnel of its medical department includes consultants in Boston, Toronto and London and a staff of 59 physicians and 42 registered nurses. Last year it celebrated 25 years of successful business, by an International Conference on Health Problems in Tropical America; to which came as its guests and participated actively in its proceedings, the most eminent members of the medical profession devoting their attention to tropical medicine and hygiene.

There came from England 10, France 2, Germany 2, Scotland 1, Canada 2, United States 29, Venezuela 1, and Brazil 5; besides the gathering from tropical countries in which the plantations of the company are located. There were present such medical leaders as Banting of Toronto, Sir Arbuthnot Lane, and Sir Arthur Newsholme of London, Profs. Lepine and Garin of Lyons, Profs. Fuelleborn and Buehlens of Hamburg, Hideyo Noguchi of New York and Rosenau of Boston. It was the most representative and truly international medical congress held since the beginning of the great war—a triumph indeed, for Dr. W. E. Deeks, the General Manager of the Medical Department.

Big business has found, in many places and along many lines, the importance of medical service in reaching high industrial efficiency; which is quite as profitable when directed to securing good illumination and reduced labor turn over, as thru first aid to the injured or limiting the prevalence of mosquito borne diseases. The invasion of the tropics by civilization depends, absolutely, on the corps of health engineers; who, following the leadership of Gorgas, have rendered health and activity possible to the army of workers that are spreading the use of tropical foods and are changing the dietary of the civilized world.

The 71 addresses and papers published in this volume cover topics of the widest range of interest in medicine and hygiene. Geo. E. Vincent, of the Rockefeller Foundation, treats of Tropical Medicine an International Adventure. Frederick L. Hoffman, the insurance statistician, discusses problems of Mortality and Acclimatization in the Central American Tropics. Frank B. Mallory, the Boston pathologist, urges the importance of routine examination of pathologic material in the tropics. Banting points out: "Insulin is not a cure for diabetes; it is a treatment." Yet it renders recovery possible. It enables all patients to use and store sugar. "In some moderately severe cases, the tolerance has increased sufficiently so that they no longer require insulin." There were 10 workers joined in the reports on yellow fever, under the leadership of Noguchi; and the discussion was opened by Sir Thomas Oliver. Experts in engineering and medicine from both hemispheres joined in the discussion of malaria and black water fever.

Only two of the papers refer to topics strictly in the domain of ophthalmology. These were on, Trachoma and Pannus, by Miguel Arango of Baraquilla, Colombia; and on the "Blinding Filaria," of Guatemala, by Friedrich Fuelleborn, of Hamburg, Germany (see p. 915). But in this volume there is an enormous amount of information that any worker in ophthalmology, or any other branch of medicine, can study and think about; with the result that it will broaden his outlook and improve his fundamental preparation to deal with the particular problems that he has chosen to work at.

E. J.

CORRESPONDENCE.

The London Convention: A Correction.

To the Editor: Referring to the observations on the London Convention which appeared over my initials in the September issue of the A. J. O., may I mention that the insertion of a semicolon considerably changed the view which I intended to express in the last sentence of the first complete paragraph in the right hand column of page 746. The sentence was not intended to suggest that all reports of cases were out of place at such a gathering, but only that it would be better to omit reports of such cases as, altho interesting, were not decidedly novel or of outstanding importance.

Yours Sincerely,

Denver, Colorado. WM. H. CRISP.

ABSTRACT DEPARTMENT

Reprints and journal articles to be abstracted should be sent to Dr. Lawrence T. Post, 520 Metropolitan Building, St. Louis, Mo. Only important papers will be used in this department, others of interest will be noticed in the Ophthalmic Year Book.

Bluemel, C. S. and **Greig, Wm. M. Tryparsamid in Neurosyphilis.** Colorado Medicine, Jan. 1925.

This paper presents a brief survey of the results obtained in treating fifty cases of neurosyphilis with tryparsamid. Thirty-five of the fifty patients had general paresis. The remaining fifteen had various forms of neurosyphilis—such as tabes, spastic paraplegia, hemiplegia, cranial nerve palsies, etc.

The full course of treatment consisted of sixteen intravenous injections of tryparsamid, given at intervals of a week. The initial dose was one gram, the second dose two grams, and the remaining fourteen doses three grams. During treatment the patients received a quarter of a grain of protoiodid of mercury by mouth three times a day.

The patients were warned of the various ocular symptoms reported from the use of tryparsamid and they accepted treatment with full knowledge of the risk. In the case of paretics, consent was obtained from the relatives as it was felt that the decision should not be left to the patients themselves.

Among thirty-five paretics, six died during the course of treatment. Nine were worse after treatment than before. Three of them developed serious eye symptoms. Ten showed no material change following treatment. The remaining ten improved.

The results with the fifteen cases of cerebrospinal syphilis were little different. Three patients died during treatment. Six showed no change whatever. Of the remaining six, two showed moderate improvement and four slight improvement.

During treatment, six of the fifty patients complained of transient subjective eye symptoms, such as dazzling, dimness of vision, a film before the eyes, snowstorms on closing the eyes, a yellow patch on looking at white objects, flickering of the electric lights, etc. The symptoms were transient and unaccompanied by objective changes in vision, or changes in the eyegrounds. In all these cases treatment was temporarily interrupted and was resumed when the symptoms disappeared.

In four other cases there were similar ocular disturbances which were subsequently followed by serious visual impairment. In one of these cases the symptoms were those of toxic amblyopia; in the other three the symptoms pointed to optic atrophy.

Toxic amblyopia occurred in a young man of thirty-one who had advanced spastic paraplegia which confined him to a wheel chair. He was one of our early patients and received an initial dose of three grams of tryparsamid instead of the one-gram initial dose which we adopted later. Vomiting occurred a few hours after treatment. On the following day he complained that things looked gray and hazy and on the next day he was unable to see. Eight weeks later, there having been no return of vision, he wished to continue treatment and was given a second injection, consisting of a gram and a half of tryparsamid. This treatment was followed by

acute orchitis. No further treatment was given and he died a month afterward.

This patient had no objective disturbance of vision before treatment, altho his optic nerves were pale. Apparently the central fibers of the nerves had escaped destruction by the syphilitic process but proved vulnerable to a single dose of tryparsamid.

The second patient, a paretic, began to complain after his eighth treatment that he could not see clearly. Examination showed no disturbance of central color vision or impairment of visual acuity. He was able to write letters seven weeks after first complaining of his sight. Vision then became rapidly impaired and at the end of the ninth week was reduced to light perception. In this case treatment was discontinued when the patient first complained of ocular symptoms, but blindness ensued from optic atrophy. Prior to treatment, the optic discs were normal and the pupils sluggish. With loss of vision the discs became pale and the pupillary reflex disappeared.

The third patient complained after his ninth treatment, of dazzling and of not seeing well in shadows. He was able to read the newspaper and his central color vision was normal. Treatment was discontinued, but vision failed three weeks later and in the course of two or three days was rapidly reduced to light perception. Before treatment the pupils were sluggish and the eyegrounds normal. The discs later became pale and the pupillary reflexes disappeared.

The fourth patient to suffer visual impairment was a bed-fast paretic with pallid discs, who was sufficiently demented to be unable to cooperate in examination. After the thirteenth treatment he appeared not to see well and was soon unable to feed himself. A few weeks later he could not recognize the attendants and his vision seemed to be reduced to light perception. He died seven weeks after treatment was discontinued.

There were five patients with pale optic discs, who suffered no visual disturbance, either subjective or objective. Two patients had slight pallor of the discs following treatment, but suffered no visual impairment.

A year ago tryparsamid was a new and promising remedy for neurosyphilis. Today it can be more accurately evaluated. For ourselves we would appraise it as a form of therapeutic dynamite, notable chiefly for its dangers. Its benefits seem few, tho of course they might be greater with more protracted treatment.

Perhaps the tryparsamid is not altogether to blame for the visual disasters that befell our patients. Optic atrophy is one of the common tokens of neurosyphilis, and it would be comforting to attribute it in this instance to the disease. Nevertheless, one cannot readily escape the conviction that the tryparsamid is largely responsible for the adversities encountered. L. T. P.

Smith, David Priestley. Centripetal Fan Scotoma in Glaucoma. Brit. J. Ophth. May 1925, vol. 9, p. 233.

The author in testing the field of chronic or suspected chronic glaucoma devotes his greatest attention to the central vision. He does not find it necessary in most cases to carry the examination beyond the 40 or 50 degree circle. The circular method is employed, more than the radial, because in chronic glaucoma the borders of the area of maximum blindness are generally more radial than concentric within the 40 or 50 degree circle. This is particularly advantageous in outlining a "spike" area of blindness. The test object is placed first at ten degrees from the fixation point and moved round on this circle; if no defect is found, the 20, 30, 40, and 50 degree circles are tested in the same way and if no defect is found on any of them, the field is tested no further on that occasion. But if a defect is found on, say the 10 degree circle, the 5 degree circle is tested and if this also shows a defect, the 2½ degree circle is tested, if the patient fixes steadily enough. And similarly, on whatever circle a defect is first found, one proceeds to examine on successively smaller circles, until the inner limit of the scotoma is located; one then continues examining on successively larger circles from the

one on which the defect was first encountered, increasing the radius by ten degrees or sometimes only five degrees at a time.

The advantage of the circular method applies chiefly to the central parts of the field; outside the 40 or 50 degree circles the scotoma often spreads out like the mouth of a trumpet and if one finds the border here, or anywhere else, more concentric than radial, it is, of course, better to move the test object radially in that region. Twenty-five illustrative charts accompany the contribution. D. F. H.

Riddoch, Geo. and **Goulden, Charles. Relationship Between Subarachnoid and Intraocular Hemorrhage.** Brit. J. Ophth. May 1925, vol. 9, p. 209.

This contribution is an exhaustive study of the subject with the report of five illustrative cases in one of which a pathalogic study was made, together with reproductions and a bibliography of sixty-seven. The etiologic, anatomic, clinical ophthalmoscopic signs and pathologic report are discussed. Conclusions.

1. Five cases of subarachnoid hemorrhage from ruptured basal aneurysm are described. In two cases only was the clinical diagnosis corroborated by postmortem investigation.

2. In no case was there evidence of cardiovascular, renal diseases of syphilitic infection.

3. Four patients showed intraocular hemorrhage, retinal, subhyaloid or vitreous. The visual defect tended to improve, but recovery was never complete.

4. Histologic investigation of an eye strongly suggests that the cause of intraocular hemorrhage in such cases is obstruction of the central vein of the retina at the point where it leaves the optic nerve and enters the dural sheath. As the result of this obstruction the intraocular venous pressure is raised so that one or more vessels rupture. The mechanism of production of the hemorrhage is, therefore, in our opinion the same as that for papilledema due to increased intracranial pressure.

5. The main factors that determine the occurrence of intraocular hemorrhage in cases of bleeding into the cerebral subarachnoid space from ruptured aneurysm are the severity of the leak, the distance of the aneurysm from the optic nerves and the presence or absence of arachnoid adhesions in the cisterna basalis. D. F. H.

NEWS ITEMS

DEATHS.

Dr. George Olson Suffa, Boston, aged sixty-eight, died September sixth.

Dr. Arthur C. Rumery, Mason City, Nebraska, aged forty-six, died August twenty-fifth of heart disease.

Dr. Oliver Tydings, Chicago, aged seventy-one, died September twelfth of cerebral hemorrhage.

Dr. James Taylor, Jr., Worcester, Massachusetts, aged fifty-six, died September second, at Portland, Maine, following an operation.

SOCIETIES.

The Kansas City Eye, Ear, Nose and Throat Society, Dr. James W. May, president, and Dr. Ambrose E. Eubank, secretary, meets at the Baltimore Hotel, on the evening of the third Thursday of each month from September to May. The afternoons of the third Thursday in November, January and March are devoted to clinical work.

The following have been elected as officers of the Ophthalmological Society of the United Kingdom for 1925-1926: President, Sir John Herbert Parsons; Vice-presidents, A. Maitland Ramsay, Leslie Paton, H. Herbert and Elmore Brewerton; Treasurer, Sir Arnold Lawson; Council, A. Levy, M. L. Hepburn, J. F. Cunningham, J. Wharton (Manchester), F. P. S. Cresswell (Cardiff), R. Foster Moore; Secretaries: Charles Goulden and H. P. Gibb.

The eighth congress of the Société francaise d'Ophtalmologie was recently held in Brussels. Many foreigners were present at the meeting, among whom were Lawford of London, Bousquet of Quebec, Boulay and Saint Denis of Montreal, Angelucci of Naples and Barraquer of Barcelona. Interesting papers were presented: By Morax on the etiology of trachoma, and by van Duyse on, "Were Artificial Eyes Known to the Ancients?" "Local Vaccination," by L. Carrere discussed experiments on animals and clinical cases, showing that local vaccina-

tion on the eye by means of bouillon vaccines prepared according to the technic of Besredka gives undeniably good results. This method of preventive, or curative vaccination should practically replace other modes of vaccination. Local vaccination may be employed alone in the treatment of palpebral affections, in the form of an appropriate bouillon vaccine; or, in the treatment of dacryocystitis by lavages of the tear sac. Local vaccination may be employed also as an adjuvant treatment in microbic affections of the cornea. "Pathogenesis of Detachment of Retina," by Weekers of Liege, and "The Treatment of Detachment of the Retina," by Gonin of Lausanne.

PERSONALS.

Dr. Harry V. Würdemann, Seattle, has been elected for the third time President of the Reserve Officers' Association for the state of Washington.

Dr. J. Rufus McCracken, Waynesville, North Carolina, has opened a small private hospital for the care of eye, ear, nose and throat cases.

Dr. Edward A. Shumway announces the removal of his offices to the Central Medical Building, Chestnut and Eighteenth streets, Philadelphia.

The Graefe prize has been awarded this year by the German Ophthalmological Society to Dr. E. Seidel, chief of the university eye clinic at Heidelberg, for experimental research on glaucoma and the interchanges of fluids in the eye.

MISCELLANEOUS.

The Hadassah Medical Organization is making a campaign in Jerusalem against trachoma.

Ground has been acquired in Memphis, Tennessee, for the erection of an Eye, Ear, Nose and Throat hospital. Plans are now being made for its erection.

A special department of music for the, blind, has been founded at the Master Institute of United Arts of New York. It has announced several scholarships in music for the blind, which will be awarded for the first time this year.

Beginning October 5th, 1925, Dr. Basil Graves of London, England will give three, two weeks' courses, in Slit Lamp Microscopy of the Eye, at the New York University and Bellevue Hospital Medical College.

The Post Graduate Hospital and Medical School, Chicago, Illinois, announces a second special course on Slit Lamp Microscopy of the Living Eye, with illustrated lectures and personal instruction by Dr. Robert Von der Heydt, beginning October 26th to October 30 inclusive.

The Wilmer Eye Institute opened October first with sixty beds, in the Nurses' Home Building of the Johns Hopkins Hospital group. The men who will devote full time to the institute are Drs. Wilmer, Bagley and Wygodski. Announcement of the appointments to the staff are as follows: Dr. Wm. Holland Wilmer, director; Dr. Cecil H. Bagley, resident ophthalmologist and instructor in ophthalmology; Drs. Leo J. Goldbach, Alan C. Woods and Clyde A. Clapp, associates in clinical ophthalmology; Drs. Reginald D. West and Robert Y. Fechtig, instructors in clinical ophthalmology; Drs. R. S. Wygodski, Bernard V. Kelly, Jos. E. Brumbach, Jos. G. O'Brien, Aaron Robinson, Franklin Hazelhurst, Jr., Chester E. Hurwits, Frank A Pacienza and Frederick A Holden, assistants in clinical ophthalmology. Charles L. Burky will do research work.

On July 20, while assisting Morgan Palmer to defend the latter's ranch property on the upper Sungari River, Dr. Harvey J. Howard, Head of Department of Ophthalmology in the Peking Union Medical College, Pekin, China, was taken prisoner by Manchurian Bandits, and Mr. Palmer was killed. The American Consul at Harbin immediately took steps toward effecting his release. His whereabouts was at first unknown, altho contact was soon established with his captors; who in a letter demanded, "money and bullets," as a ransom for Dr. Howard. The release of the captive proved a matter of considerable difficulty, as the bandits roamed over a wide area, and their whereabouts at any particular time was uncertain. Dr. Howard was taken across the Sungari River and into the Kirin Mountains. He was fairly well treated. General Peng, Commander of the bandit suppression troops, was vested with full authority to take what ever steps were considered necessary to secure the release of Dr. Howard. Later news located him in a bandit camp about 40 miles up the river from Fuchowhsien. A Chinese officer offered himself in exchange. Being pursued by the Chinese troops, the bandits moved on to Huachuan in the province of Kirin. Gen. Peng and Col. Chang with their troops came up only 24 hours behind the bandit party; and one of the leaders of the brigands was killed in a battle, and the band split into two parties. The unmounted brigands were holding 10 persons captive, beside Dr. Howard.

A despatch from Peking states that after more than two months' captivity, Dr. Howard with six of the Chinese prisoners has been released. In a message sent to his wife he stated that he was well, altho emaciated. It is presumed that Dr. Howard and his bandit captors are still in Pa Li Hsien, not far from Fuchowhsien, where his release had been expected.

Current Literature

These are the titles of papers bearing on ophthalmology. They are given in English, some modified to indicate more clearly their subjects. They are grouped under appropriate heads, and in each group arranged alphabetically, usually by the author's name in **heavy-faced type.** The abbreviations mean: (Ill.) illustrated; (Pl.) plates; (Col. Pl.) colored plates. Abst. shows it is in an abstract of the original article. (Bibl.) mean bibliography and (Dis.) discussion published with a paper.

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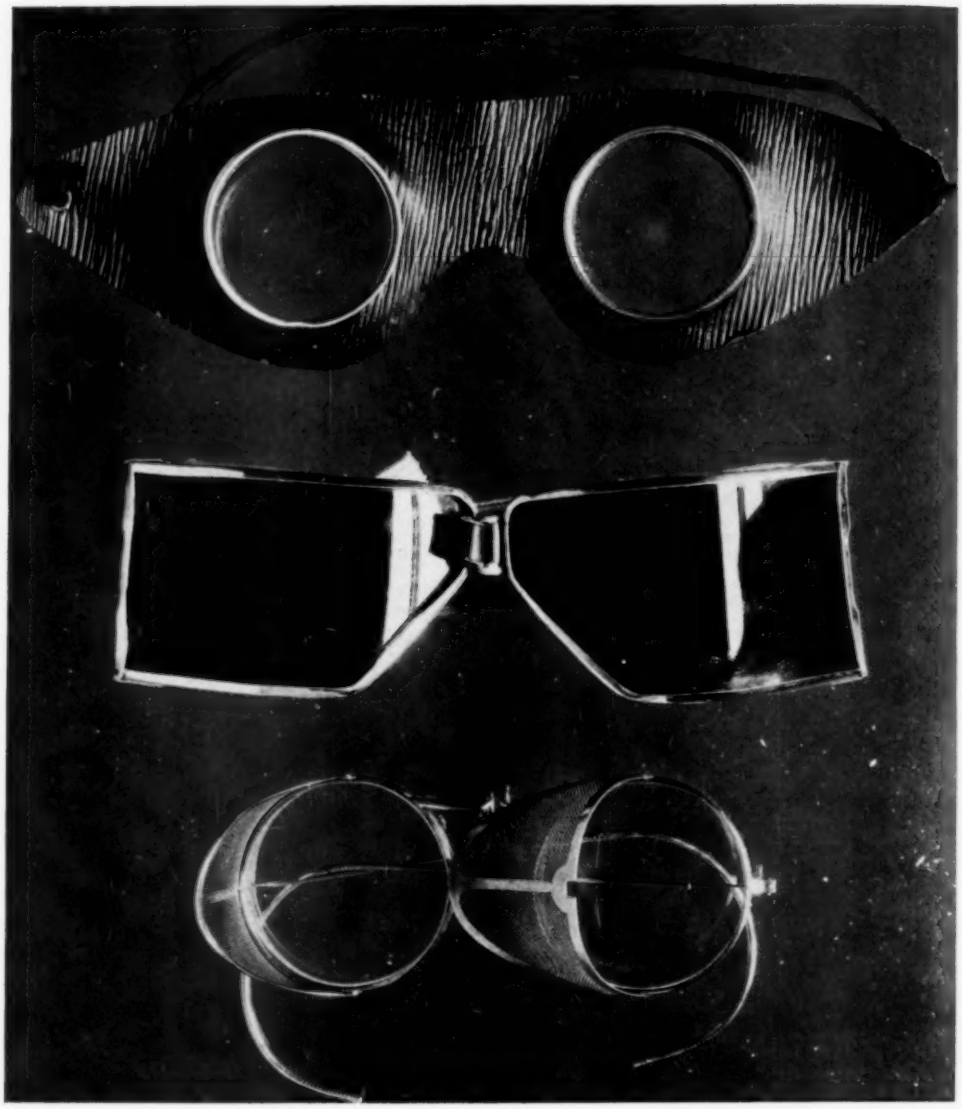

FIG. 1—FORMS OF GOGGLES USED IN EXPERIMENTS.

A. INEXPENSIVE BUT UNCOMFORTABLE.
B. VERY EXCELLENT BUT EXPENSIVE AND SOMEWHAT BURDENSOME.
C. MOST PRACTICAL TYPE.

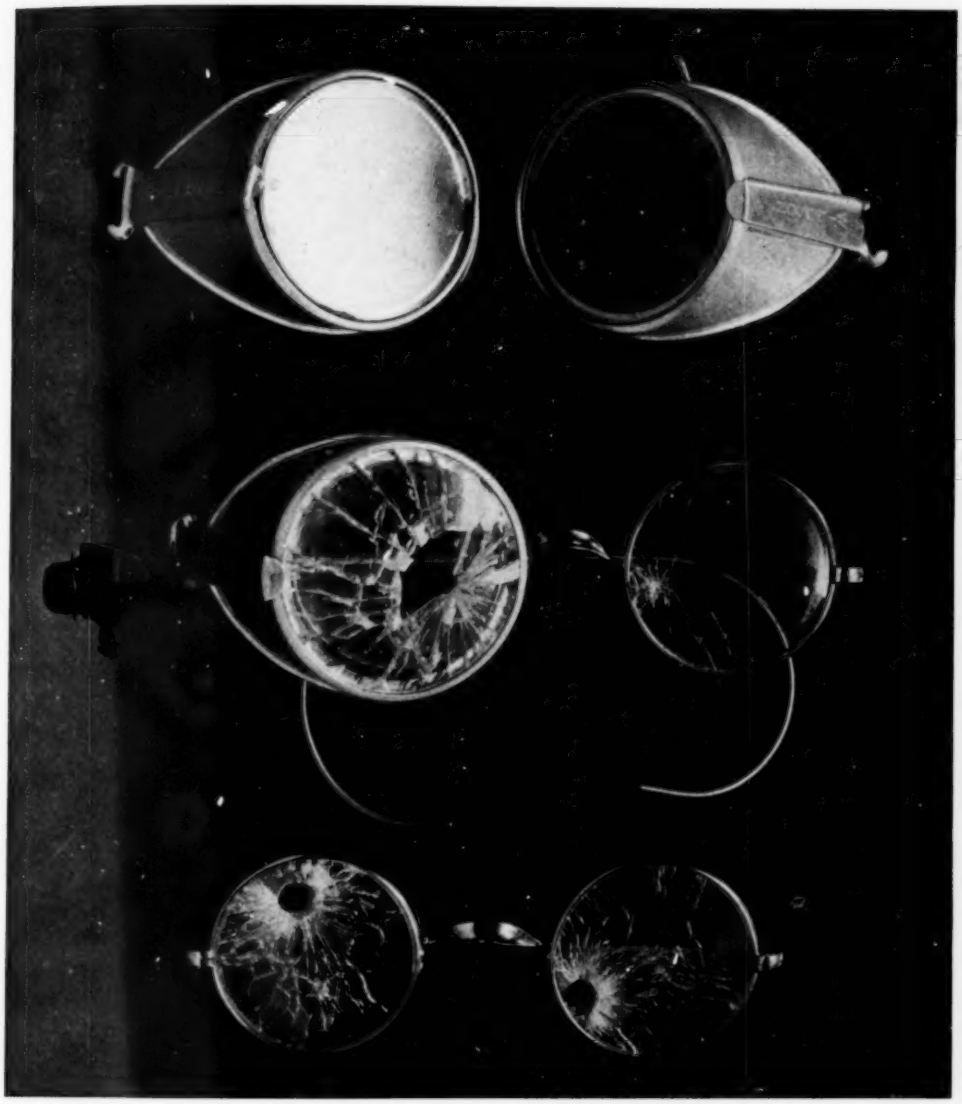

FIG. 2

A. SOCALLED CLIP CUP ADAPTED TO FIT OVER REGULAR SPECTACLES.
B. LEFT. CLIP CUP IN PLACE. LENS SHATTERED BY AIR RIFLE BULLET, SPECTACLE LENS NOT INJURED
RIGHT. LAMINATED GLASS CRACKED BY AIR RIFLE BULLET, BUT LENS NOT SPLINTERED.
C. LENSES PERFORATED BY .22 RIFLE BULLETS, BUT GLASS NOT SPLINTERED.